



**80174964**  
Edition 1  
October 2005

# Starter Relay Valve

RR250-F30

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## Installation and Maintenance Information



**Save These Instructions**

***IR*** Ingersoll Rand®

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**WARNING**

**General Product Safety Information**

- Important Safety Information enclosed.
- Read and understand this manual before operating this valve.
- It is your responsibility to make this safety information available to others that will operate this valve.

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**Safety Information - Explanation of Safety Signal Words**

**DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

**NOTICE**

Indicates information or a company policy that relates directly or indirectly to the safety of personnel or protection of property.

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**WARNING**

**Failure to observe the following warnings could result in injury**

- Do not use this Starter Relay Valve with natural gas or other flammable gases.
- Always bleed off the air pressure before attempting to remove the Starter Relay Valve from the Receiver or before attempting to perform any maintenance on the Starter Relay Valve.
- Never attempt to disassemble the Starter Relay Valve until after the air pressure has been bled off. Otherwise internal parts of the Starter Relay Valve will be blown out with the great force.
- Always wear eye protection when installing, removing or performing maintenance on this Starter Relay Valve.

**NOTICE**

This Starter Relay Valve is specially designed and manufactured by Ingersoll-Rand for use on Starter installations. Install it according to the following instructions:

**Assembling Relay Valve on starter**

The Relay Valve must be connected with two flanges SAE 3000 - DN 2" 1/2.

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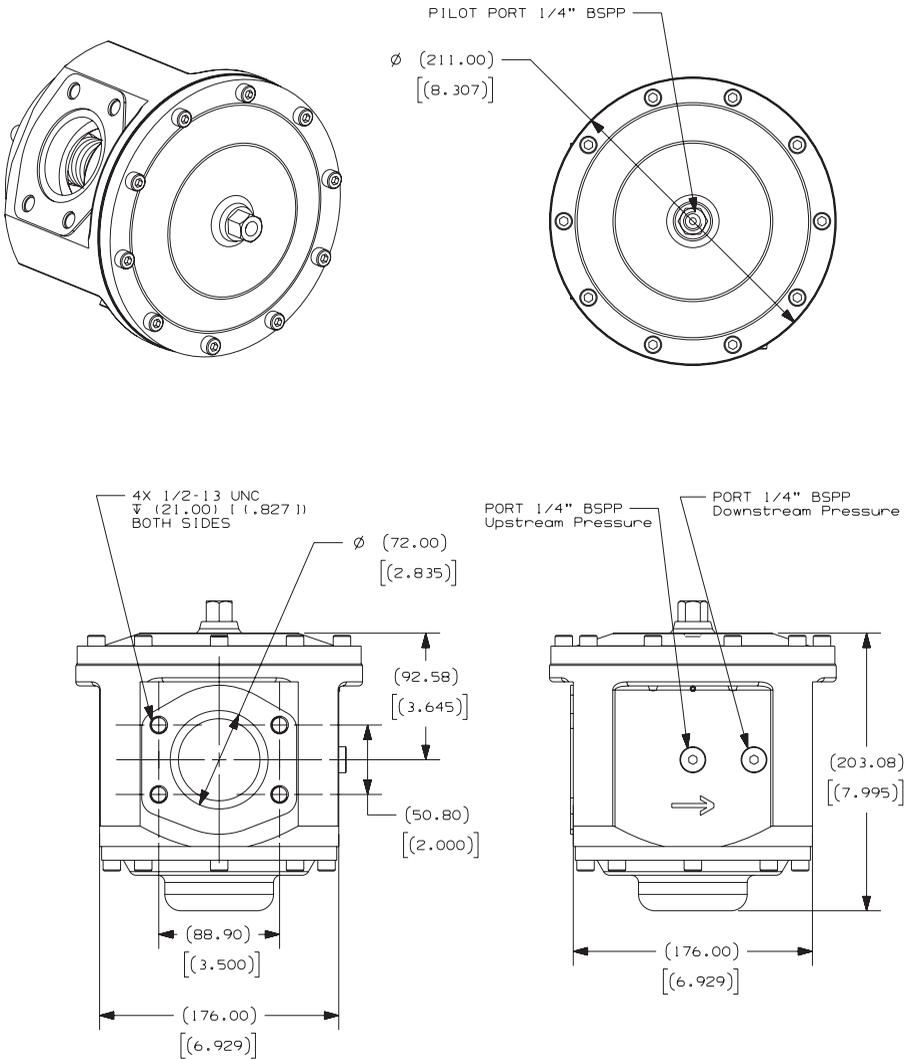
**NOTICE**

The use of other than genuine Ingersoll-Rand replacement parts may result in safety hazards, decreased starter relay valve performance and increased maintenance and will invalidate all warranties.

Ingersoll-Rand is not responsible for customer modification of valve for applications on which Ingersoll-Rand was not consulted.

Repairs should be made only by authorized, trained personnel. Consult your nearest Ingersoll-Rand Authorized Servicenter.

# Specifications



(Dwg. 80183411)

**2-1/2" → RR250-F30 - Order part number 16675845**

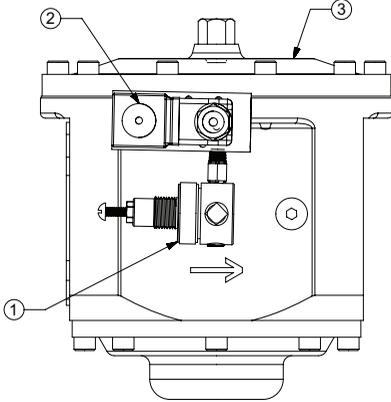
Max. Inlet Pressure	30 Bar	435 psi
Max. Outlet Pressure	10 Bar	145 psi
Max. Flow	1600 dm <sup>3</sup> /s	3400 scfm
Max. Temperature	80°C	176°F
Min. Temperature	-25°C	-13°F

## Description

The RR250-F30 includes valve and regulator functions.

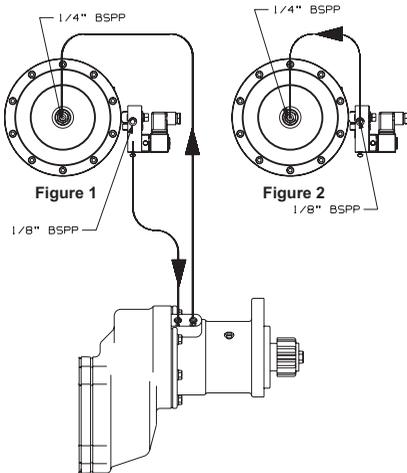
The RR250 is made of three main components:

1. The master regulator which sets the pilot pressure.
2. The solenoid valve which will open or close the system when the operator actuates the switch key.
3. The slave regulator which is the main body.



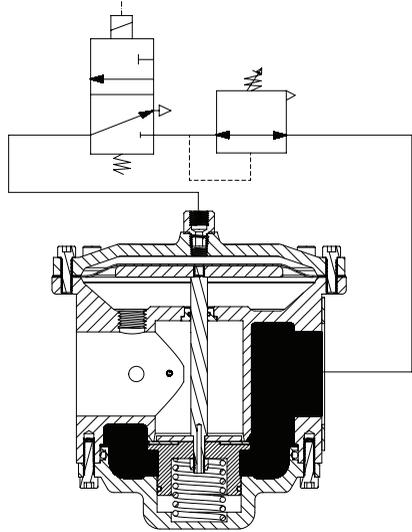
(Dwg. 80177892)

The slave regulator (3) will receive the signal from the master regulator (1) through the solenoid valve (Fig 2). For pre-engage Starters (Fig 1) the signal pressure will come from the master regulator through the solenoid valve to the pilot "In" port of the air starter drive housing, giving the signal to engage the drive pinion into the ring gear. After engaging the drive pinion it will come out through the "Out" port of the drive housing and will go to the top cover of the slave regulator.

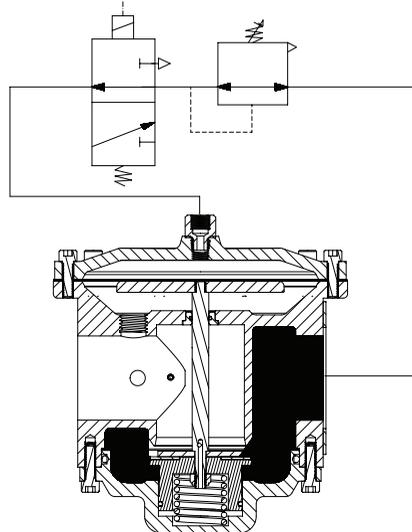


(Dwg. 80177900)

The Slave regulator using the pressure signal on top of the diaphragm will force the piston off its seat. That allows air to flow into control chamber below the diaphragm, through the outlet port of the RR250 valve to the starter motor. Outlet pressure increases in the downstream system and sensing chamber (under the diaphragm) and applies an upward force on the bottom of the diaphragm. The diaphragm and piston move upward. Upward movement stops when the forces below the diaphragm balance the force above the diaphragm.



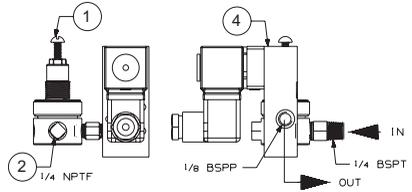
(Dwg. 80177959)



(Dwg. 80177991)

## Operation

Clockwise rotation of screw (1) will open the seat in the master regulator and will increase the pressure between the master regulator and solenoid valve (4). Do not try to exceed 11 bar or 160 psig. The pressure you adjust at the slave regulator will be slightly higher than the working pressure at the starter. In order to easily adjust the working pressure install a gauge on port (2).

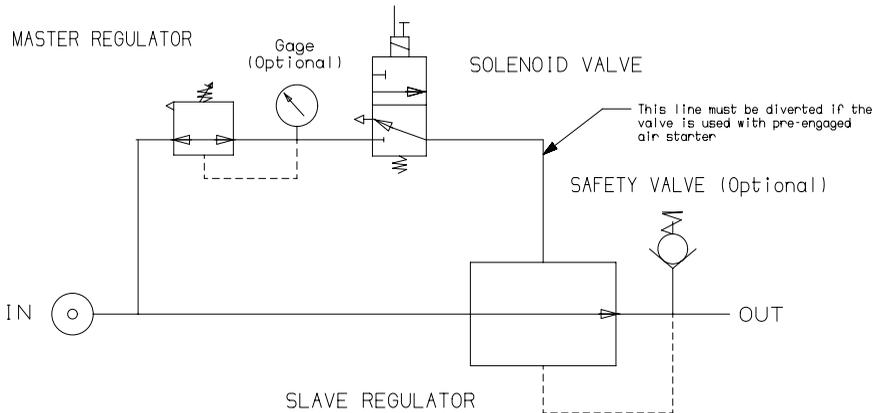


(Dwg. 80177215)

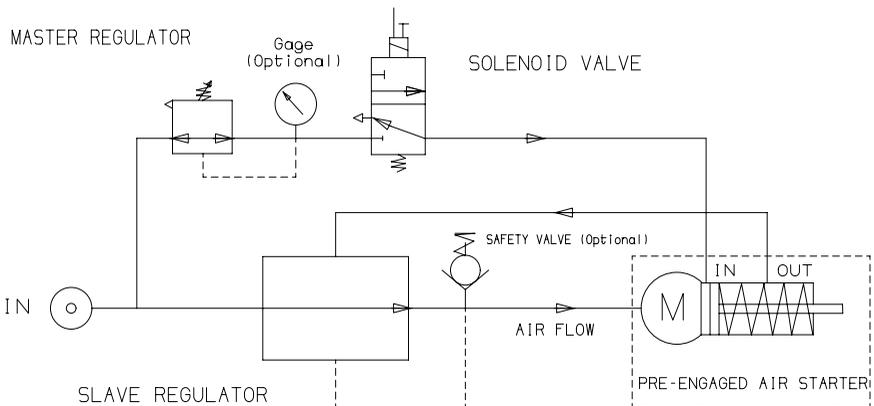
The master pressure regulator is designed as a relieving regulator. When the pressure below the diaphragm reaches 1.5 bars over the adjusted pressure, the regulator exhausts the excess pressure.

## Schematic

### For inertia drive applications:

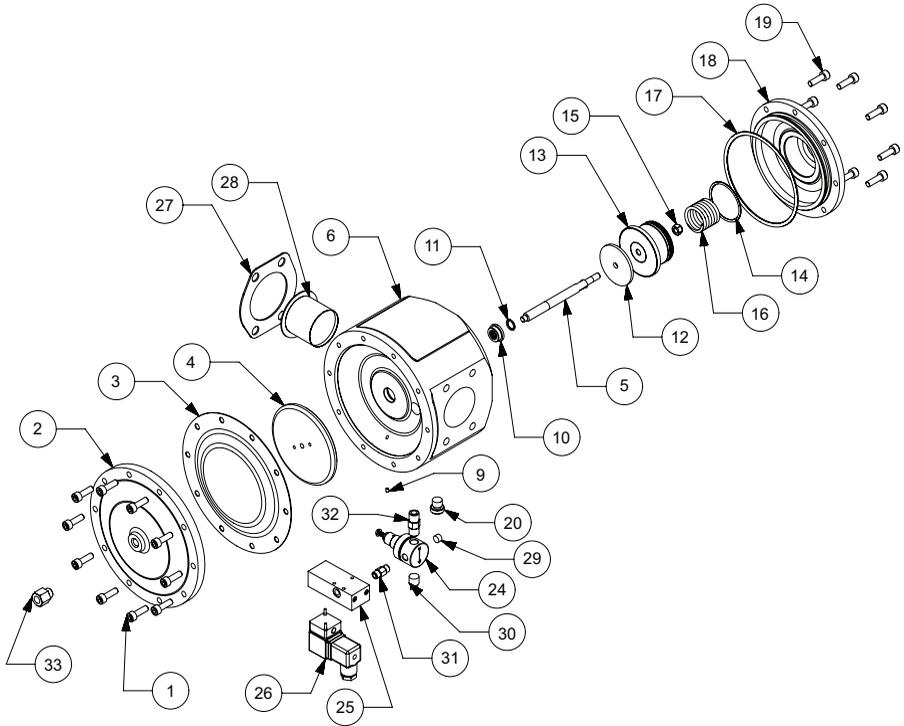


### For pre-engaged drive applications:



(Dwg. 80177223)

## Relay Valve Assembly Drawing



(Dwg. 80177843)

## Relay Valve Parts List

Item	Parts Description	Part Number	Item	Parts Description	Part Number
1	Cover Screw (10)	38632121	29	Plug	118126
2	Diaphragm Cover	38747887	30	Plug	80162225
3	Diaphragm	38747895	31	Nipple	80162233
4	Diaphragm Support	38747853	32	Nipple	80162217
6	Housing	38747788	33	Adapter	38754933
9	Set Screw	80172745	*	Piston Kit	38750956
10	Ring	38749990		(For RR250-F30)	
18	Bottom Cover	38747796		Stem - Item no. 5	
19	Bottom Cover Screw (8)	38632121		Plate - Item no. 12	
20	Plug	38648192		Piston Assembly - Item no. 13	
24	Mini Regulator	10548774		O-ring - Item no. 14	
25	Operator and Coil	49828460		Locknut - Item no. 15	
26	Solenoid Valve	49828692		Spring - Item no. 16	
27	Flange Seal	38752366		O-ring - Item no. 11	
28	Filter	38752333		O-ring - Item no. 17	

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## Maintenance

### Disassembly of Relay Valve

1. Remove screws (1). Remove cover (2) and diaphragm (3).
2. **WARNING: Bottom cover (18) is spring-loaded. Clamp relay valve in arbor press before removing bottom screws (19). Otherwise personal injury or damage to parts may occur.** Secure relay valve upside down in arbor press, applying force to bottom cover.
3. Remove screws (19). Slowly raise arbor press to remove cover (18).
4. To remove stem piston assembly: Hold diaphragm support (4) with a spanner wrench. Turn locknut (15) with a socket to unscrew the stem from the diaphragm support.
5. If the locknut comes loose before the diaphragm support, separate the piston (13), plate (12) and stem (5). Hold the stem on the flats and unscrew the diaphragm support.

### Assembly of Relay Valve

Apply Parker O-Lube grease to O-rings (11), (14), and (17), and spring (16).

Clean with isopropyl alcohol and apply Loctite® 242 or 243 to screws (1), screws (19), and diaphragm support (4).

1. Insert stem (5) of stem/piston assembly through ring (10) and O-ring (11) in housing (6).
2. Tighten diaphragm support (4) on stem piston assembly to 7.9/6.7 Nm (70/60 inch-Lbs) by holding locknut (15).
3. **WARNING: Bottom cover (18) is spring-loaded. Clamp relay valve in arbor press before installing bottom screws (19). Otherwise personal injury or damage to parts may occur.** Secure relay valve upside down in arbor press. Align bottom cover and apply force to bottom cover.
4. Install eight screws (19). Tighten to 30/26 Nm (270/230 inch-Lbs).
5. Install diaphragm (3) and cover (2).
6. Install twelve screws (1). Tighten to 25/20 Nm (220/180 inch-Lbs).



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