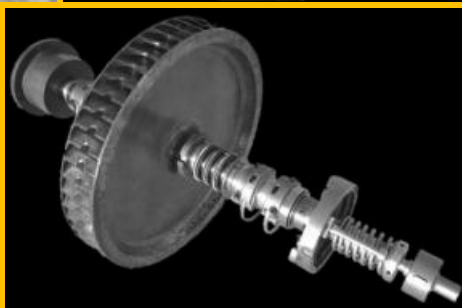
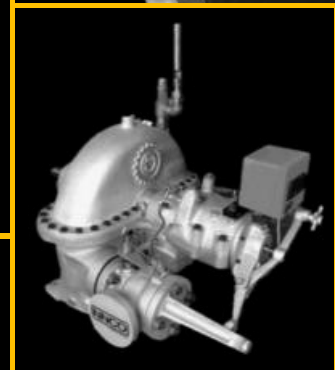
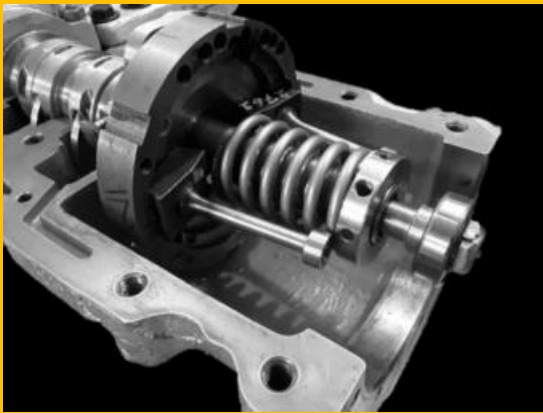


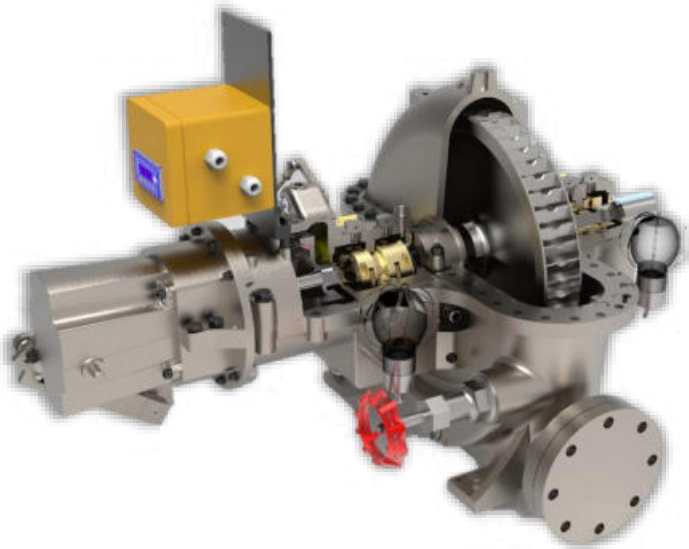
# Single-Stage Steam Turbines

## PRODUCT GUIDE

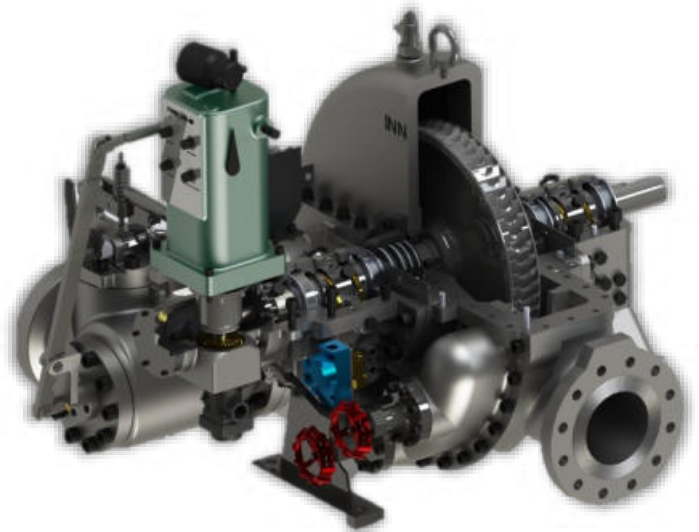


# INNCO<sup>®</sup> Single-Stage Steam Turbines

## FY



## BSY



### INNCO STEAM TURBINES

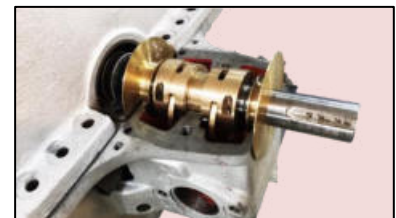
For over 30 years, INNCO steam turbines have been recognized as rugged, versatile drive solutions for **lube oil pumps, feedwater pumps, fans, generators**, and other mechanical drive applications. INNCO turbines are generally specified by the petroleum, petrochemical, chemical, sugar, paper, food processing and other industries that require continuous or standby emergency power.

### INNCO FY STEAM TURBINES

The FY turbines are bucket type turbines with split sleeve bearings, available in 3 models offering up to 240 HP (180 kW). The axial split casing allows easy access for on-site inspection and repair. The simplicity of design, cost-effectiveness in design, and time-tested reliability of the FY turbines make them an ideal selection as rugged and dependable units proper to serve a wide range of requirements.

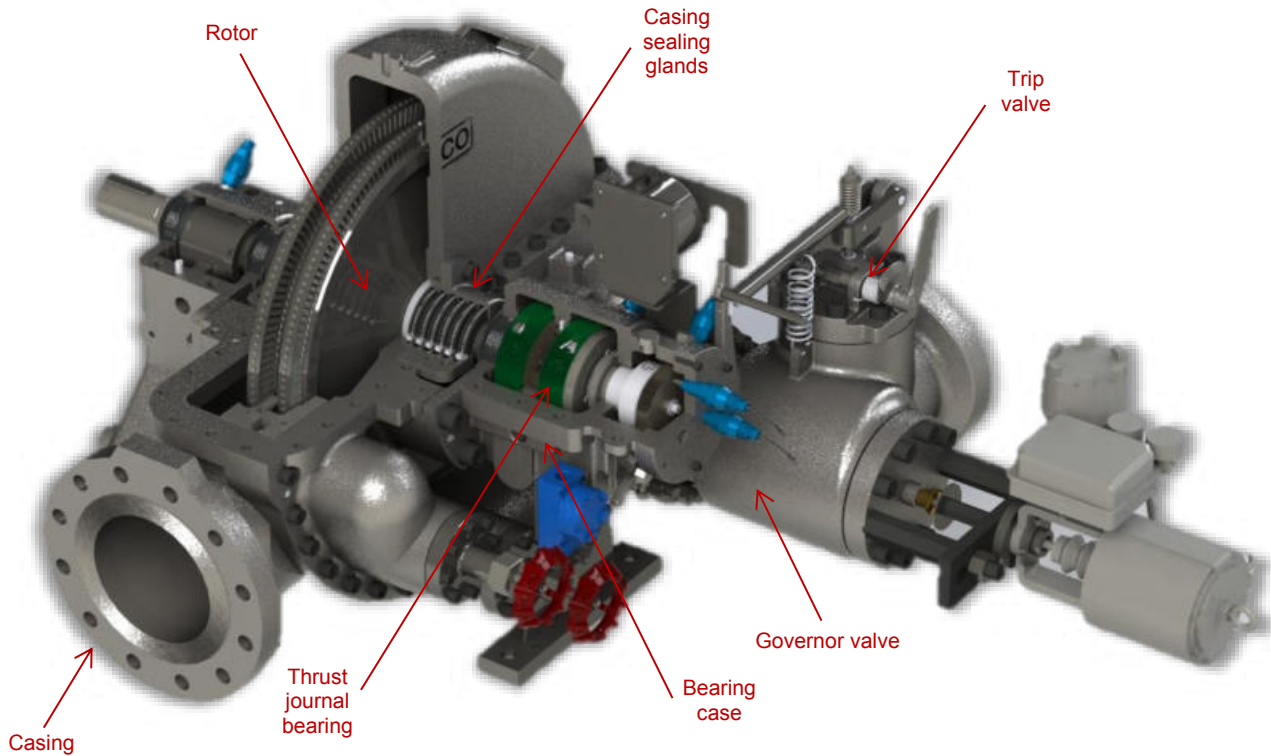
### INNCO BSY STEAM TURBINES

The BSY turbine is a bucket type turbine, consist of its special split babbitt sleeve bearings. It has contained the bigger rotor disk, which makes it much more compelling than FY types, offering up to 400 HP (300 kW). The BSY turbine also offers bigger valves for more steam flow control in compare to FYs.



*FY and BSY feature split sleeve bearings*

**SY**



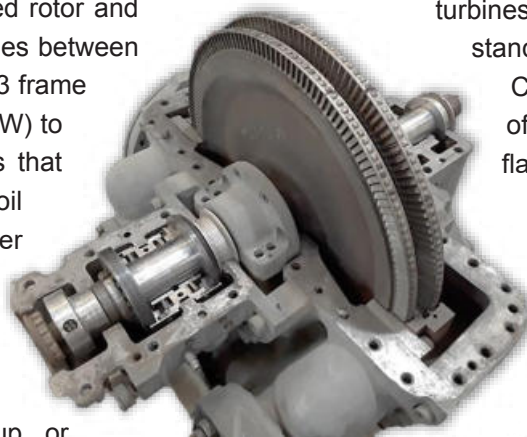
### **INNCO SY STEAM TURBINES**

Standard INNCO SY Turbines are impulse-type with a two-row, velocity-compounded rotor and one row of stationary reversing blades between the rotating blades. It's available in 3 frame sizes offering 1 to 2550 HP (1900 KW) to meet a wide variety of applications that includes pump and fan drives for oil refineries, gas pipelines and other industries. The SY has a reputation as low maintenance, and easy to operate 'workhorse'. The field has proven to be an ideal choice for an economical backup or continuous drive for pumps, fans, and generators.

### **INNCO 2SY & 3SY STEAM TURBINES**

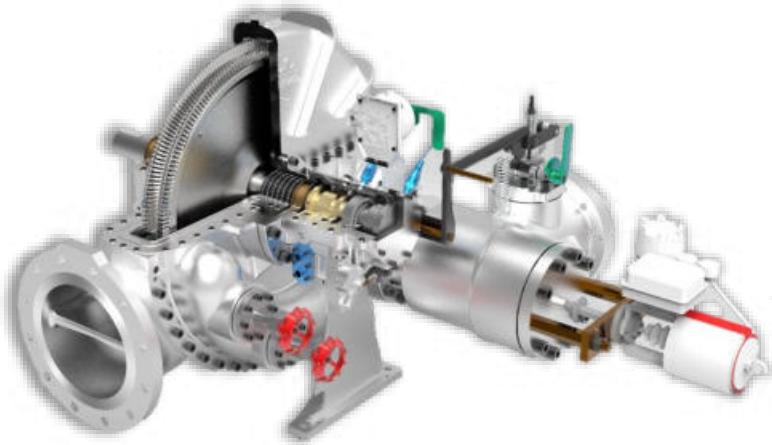
The SY turbines, the same as other INNCO turbines, are designed to meet API 611 and NEMA standards.

Configurations are available for a wide range of shaft extensions, thrust bearings, and flange mounting arrangement





## TY



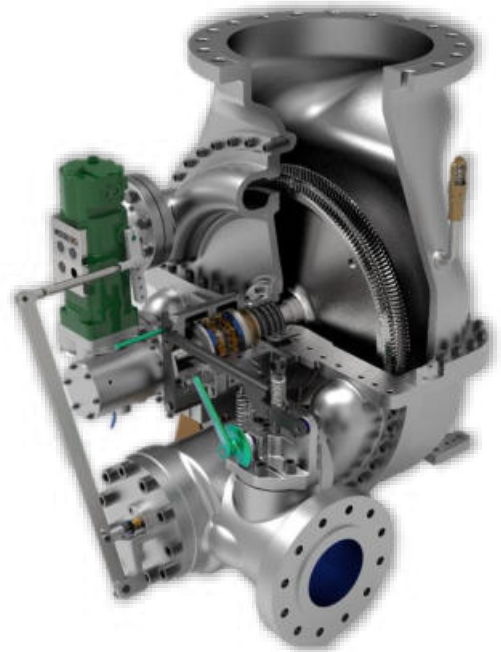
### INNCO TY STEAM TURBINES

The TY turbine offers the same configure and features as the SY types, although it includes a bigger rotor disk hence with the added benefit of more capacity range. Its rating up to 3490 hp (2600kW) to meet a wide variety of applications that includes continuous operation applications for pumps, fans, and generators operating in the most demanding industrial environments.

### INNCO 2TY STEAM TURBINES

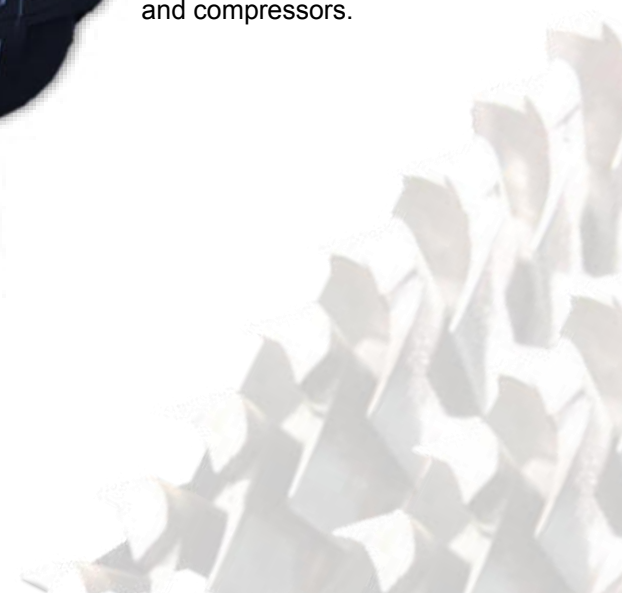
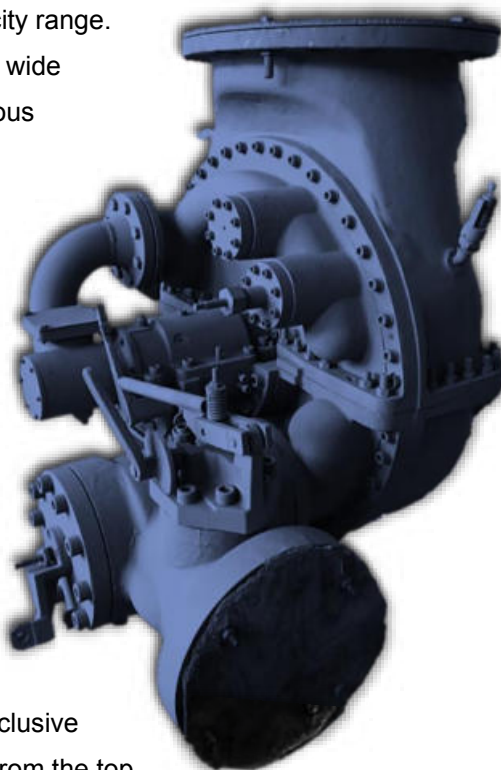
The 2TY turbine is the most potent single-stage INNCO steam turbine that produces more power without additional steam, rated up to 6440 hp (4800 kW). The 2TY design combines the reliability and parts interchangeability of the TY turbines by taking advantage of more nozzle and more efficiency. Besides, the exclusive casing design allows the steam to exhaust from the top of the turbine that can result in space saving.

## 2TY



### ADVANTAGES OF INNCO 2TY STEAM TURBINES

The 2TY steam turbine is designed for a wide range of speed trough out the continuous operation; also the ability to use as both condensing or backpressure type turbine, makes it the turnkey choice of utilizing in advanced industrial applications such as generator driving turbines or driver of large scale pumps, fans, and compressors.



# Feature & Upgrade

## Standard Features on INNCO Turbines Include:

- Meet or exceed strict API 611 requirements.
- Horizontally split casing.
- Built-up rotor construction.
- Multiple shaft end configurations.
- Carbon ring steam end.
- Mechanical overspeed trip with independent trip valve.
- Separate steam seal covers for ease of maintenance.
- Ring oiled or pressure lubrication.
- Sentinel warning device.
- Dynamically balanced multi-plane rotor.
- No-load mechanical run test.
- Constant level sight-feed oilers for oil ringed types.
- Manual speed changer.
- Single piece contoured Curtis type wheel.
- Snap-acting overspeed trip.

## Optional Features for INNCO Turbines Include:

- API 612 compliance
- Forged steel wheels.
- Special shaft materials.
- Solid, integral rotor.
- Single row wheels for blade type turbines.
- At-speed rotor balance.
- Tilting-pad journal and thrust bearings.
- Bearing vibration and temperature instrumentation.
- Steam seal upgrades.
- Independent electronic overspeed protection systems.
- Electronic or hydraulic NEMA Class D governors and variable speed controls.
- Thermal/acoustic insulation.
- Shaft-mounted main oil pump.
- Unattended auto-start.
- Steam hand valves for optimal efficiency.
- High back pressure construction.
- Solenoid trips for the remote shutdown.
- Extended inlet pressure and temperature constructions.

## Upgrades

From time to time, Iran Nasb Niroo creates conversion kits to add improved features to older INNCO turbines. If you own other INNCO turbines that lack features present on your new INNCO turbine, you may want to upgrade the older turbines. Installation of conversion kits can produce higher efficiency, improved reliability, decreased maintenance, improved safety, and more excellent interchangeability of spare parts among turbines. Consult your INNCO manufacturer's representative for information regarding factory upgrades.

### ***Over-Speed Trip System***

Meets API 611 standards.

The independent system stops the turbine under any load condition by activating the force-actuated trip valve. This is a mechanically actuated valve that interrupts the supply of steam to the turbine during an overspeed condition or other emergencies, thereby bringing the turbine to a complete stop. In the event of overspeed, the valve is activated by the overspeed trip collar, which is attached to the turbine shaft inside the Governor Mounting Housing. In the event of other emergencies, the valve can be activated using the Overspeed Trip Lever, which protrudes from the Governor Mounting Housing. For manual resetting against full-line pressure, a pilot valve relieves.

### ***Governor System***

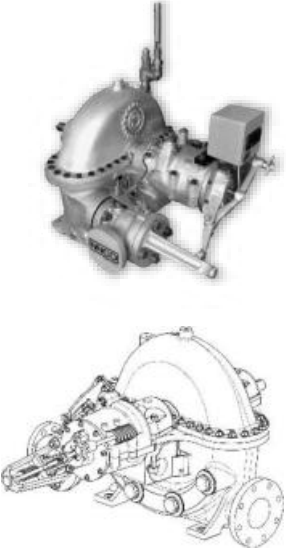
The turbines employ several types of governors to control the turbine speed. The governor positions the governor valve, via the governor linkage. The governor valve varies the steam flow through the turbine, thereby matching the driven machine power and speed.

# Selection

## General Specifications


INNCO Steam Turbines are available in 10 different types allowing greater flexibility in matching the right turbine to the desired application. Need a quote? Visit our web site at [www.irnnco.com](http://www.irnnco.com)

### Bucket Type Specifications (maximum)



Specifications (max.)	TYPE			
	FY	2FY	3FY	BSY
Initial pressure (psig/bar)	210/14.5	300/21	600/41	710/49
Initial temperature (F/C)	550/288	644/340	716/380	770/410
Exhaust pressure (psig/bar)	60/4	60/4	60/4	90/6
Speed (rpm)	3200	3200	3200	4700
Wheel pitch diameter (Inch/mm)	18"/458	18"/458	18"/458	20.5"/525
Inlet size (ANSI, inch)	2"	2"	2.5"	4"
Exhaust size (ANSI, inch)	4"	4"	4"	6"
Range of capacities (hp/kW)	160/120	200/150	240/180	400/300
Shipping weight (lb/kg)	770/350	840/380	880/400	2200/1000

### Blade Type Specifications (maximum)



Specifications (max.)	TYPE					
	ZSY	SY	2SY	3SY	TY	2TY
Initial pressure (psig/bar)	710/49	710/49	710/49	710/49	710/49	710/49
Initial temperature (F/C)	770/410	770/410	770/410	770/410	878/470	770/410
Exhaust pressure (psig/bar)	175/12	90/6	90/6	90/6	90/6	60/4
Speed (Rpm)	3600	4800	4800	6200	5000	6200
Wheel pitch diameter (Inch/mm)	24/610	22/560	22/560	22/560	28/710	28/710
Inlet size (ANSI, inch)	4"	4"	4"	4"	6"	6"
Exhaust size (ANSI, inch)	8"	8"	10"	8"	12"	20"
Range of capacities (hp/kW)	940/700	1475/1100	2010/1500	2550/1900	3490/2600	6440/4800
Shipping weight (lb/kg)	1870/850	2200/1000	2425/1100	2650/1200	2870/1300	2980/1350

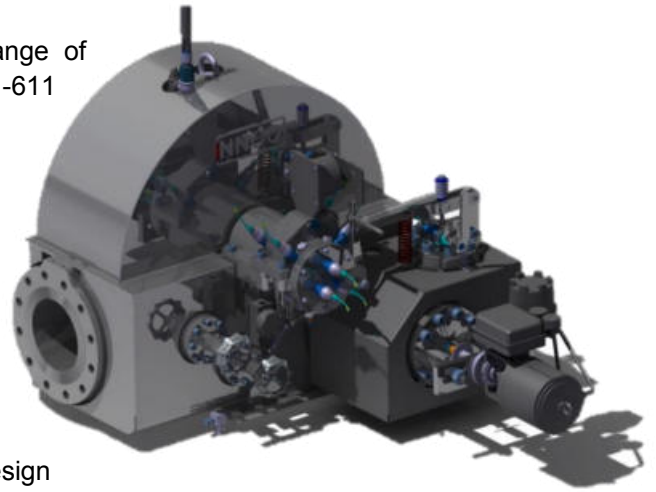


# Construction & Service

INNCO Turbines are ruggedly constructed, suitable for a wide range of mechanical drive applications, and comply with or exceed all basic API-611 and NEMA SM23 requirements.

The casing, valve bodies, shaft, wheel, blades, nozzles, valve components, and fasteners are constructed of high-grade alloy steel, stainless steel, carbon steel, and cast iron, assuring a long and dependable service life.

INNCO turbines incorporate start-of-the-art technology, and Iran Nasb Niroo is dedicated to making continuous improvements in its equipment to enhance efficiency, maintainability, and safety. In an effort to make advances available to owners of older INNCO steam turbines, the factory offers upgrade kits for incorporating significant design improvements into existing units.



## Demand the Best! Demand Genuine INNCO Parts and Service.

Behind every INNCO Turbine stands a network of sales engineers and service professionals. Iran Nasb Niroo offers comprehensive service, support and training for all types of turbomachinery regardless of the original manufacturer. Our service networks enable us to respond quickly to installation, maintenance, repair, overhauls, parts, rerates, modifications, and training. Our service teams have the experience and expertise to keep equipment performance high and maintenance costs low.

To contact our representative experts, visit our Web Site at [www.irnnco.com](http://www.irnnco.com)



### Main Office

Iran Nasb Niroo Company  
No. 22, Pardis Building, Pardis  
Alley, Ahmad Kashani St,  
Shahreziba Sq., Tehran, Iran  
Tel: 98-21-40443506(8)  
Fax: 98-21-40443509

### Factory

Iran Nasb Niroo Factory  
Abbas Abad Industrial Town  
Golestan St., Tavoos St,  
Tehran Province, Iran  
Tel: 98-21-36423459

### Shop

Iran Nasb Niroo Shop  
No. 24, Asia Industrial  
Complex, Sanaat 3 St,  
Enghelab Blvd., Shahr  
Ghodes, Tehran, Iran  
Tel: 98-214607159

Web site: [www.irnnco.com](http://www.irnnco.com)  
Email: [info@irnnco.com](mailto:info@irnnco.com)

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