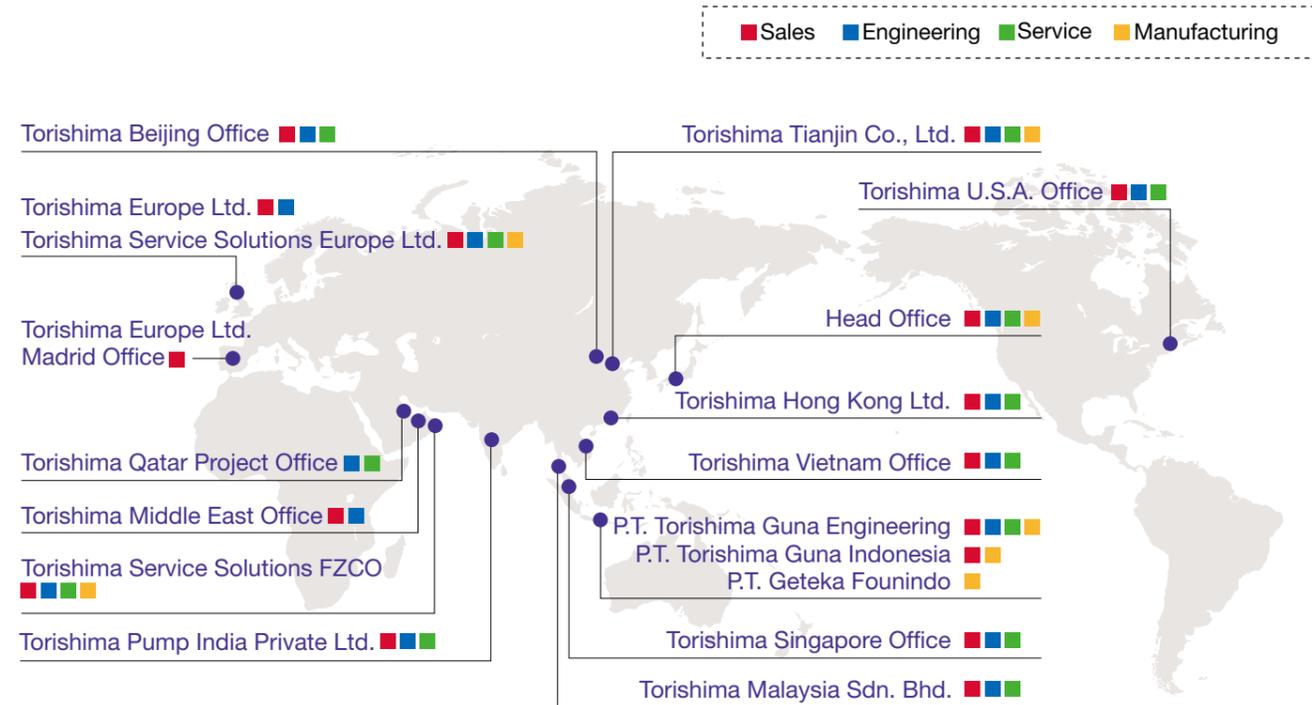


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## Pumps for Power Plant

# Innovative Pumping Solutions to Power Industry

The demand for energy continues to increase around the globe with particularly high growth rates and rapid economic expansion in the Indian subcontinent and many parts of Asia. As a result, the number of new and refurbished power plants will increase to meet this demand.

Torishima is well placed to provide a full range of pumps designed for the applications needed within the power industry from small combined cycle to large super critical thermal stations. We are able to supply boiler feed pumps, boiler circulation pumps, circulating water pumps and condensate extraction pumps as well as a range of auxiliary duties. Torishima pumps have been installed globally in this market.

## Research & Development

Energy demand continues to increase globally, however taking into account the need to also conserve power, Torishima's objective is to produce high efficiency pumping equipment. Torishima continues to invest in R & D to meet such objectives., developing high technology equipment with high reliability whilst keeping our environmental commitments.

## Service Solutions

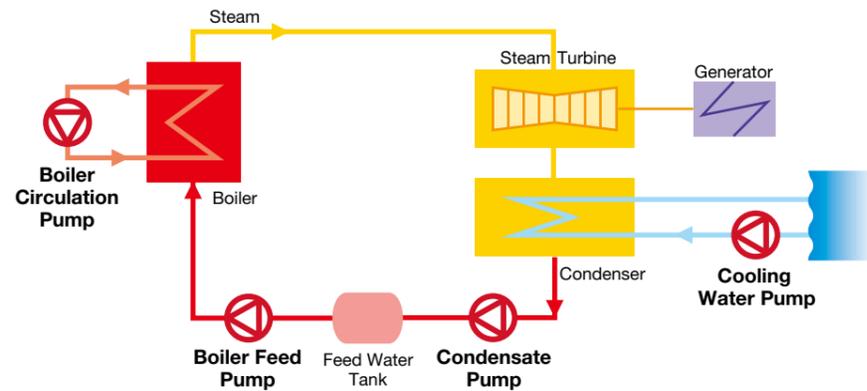
Torishima has an large installed base with pumps located throughout the world. We are conscious that we must provide a reliable service support for our clients, to this end we have a network of service facilities located in key areas providing access to both spare parts and innovative service solutions.

750MW combined cycle power plant,  
Muara Karang, Indonesia

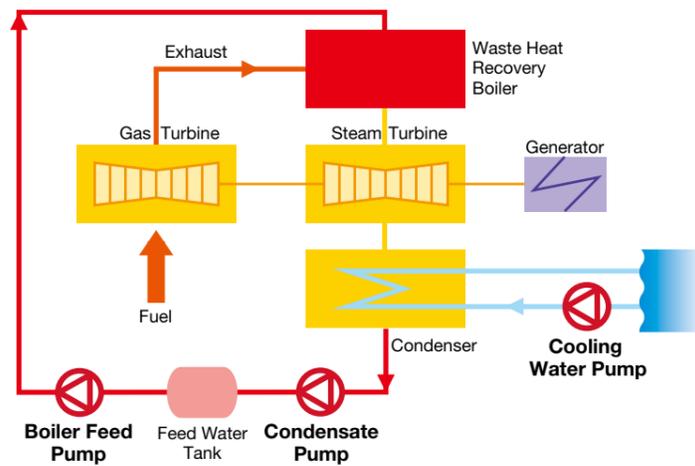


# Power Generation Systems and Main Pumps

## Steam Power Generation



## Combined Cycle Power Generation



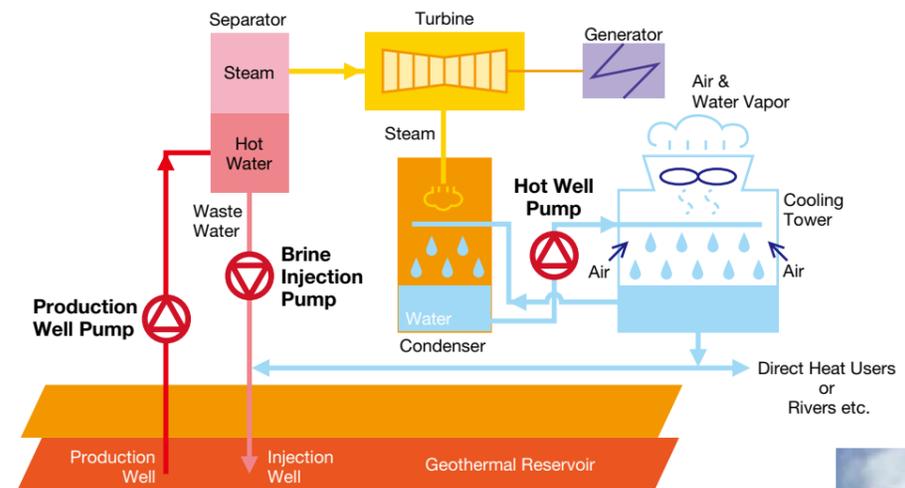
Shin-Nagoya Combined Cycle Power Plant, Japan

### Application Chart (Steam and Combined Cycle Power Plant)

Products	MHG / MHB / MHD / MHA / MMK / MML	HLV / HLAV / CPR / CPW / CHR	MMTV	CDM	CDKY	CDMV / SPV
Applications						
Boiler Feed Pump	●					
Boiler Circulation Pump		●				
Condensate Pump			●			
Boiler Feed Booster Pump				●	●	
Cooling Water Pump				●		●

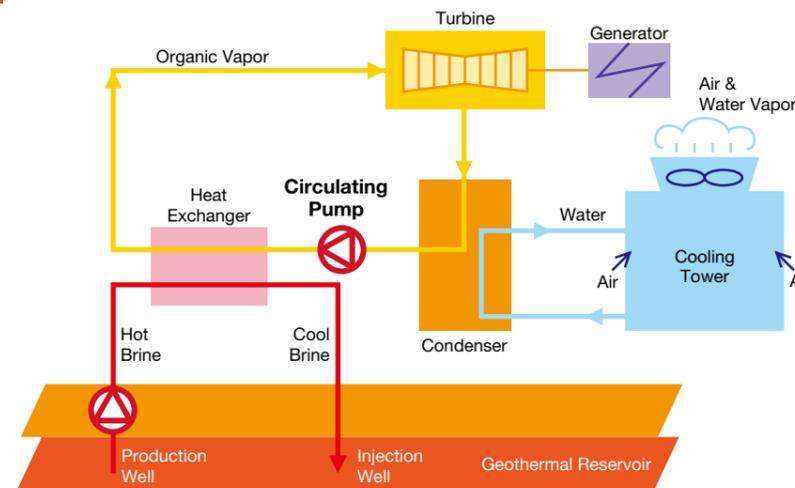
## Geothermal Power Generation

### - Flash System -



## Geothermal Power Generation

### - Binary System -



Hatchoubaru Geothermal Power Plant, Japan

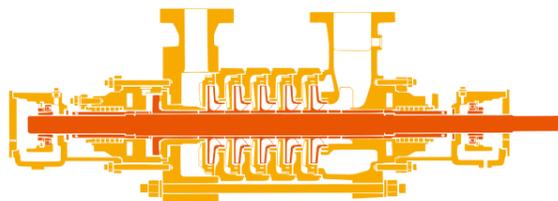
### Application Chart (Geothermal Power Plant)

Products	CDKS / MMTV	CDKTV / SPTV
Applications		
Brine Injection Pump	●	
Hot Well Pump		●

# MHG

Horizontal multistage ring section pump

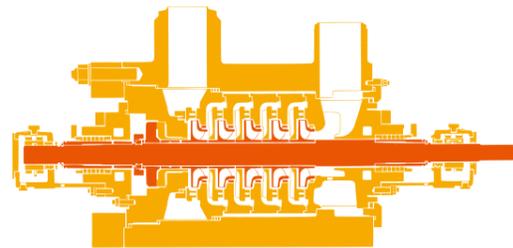
Size : 40 to 250mm (1 2/3 to 10in)  
 Capacity : up to 1,440m<sup>3</sup>/h (6,340USgpm)  
 Total Head : up to 4,200m (13,780ft)  
 Operating Pres. : up to 42MPa (6,090psi)  
 Operating Temp. : up to 230°C (446°F)  
 Speed : up to 7,000min<sup>-1</sup>



# MHB

Radially split multistage barrel casing pump

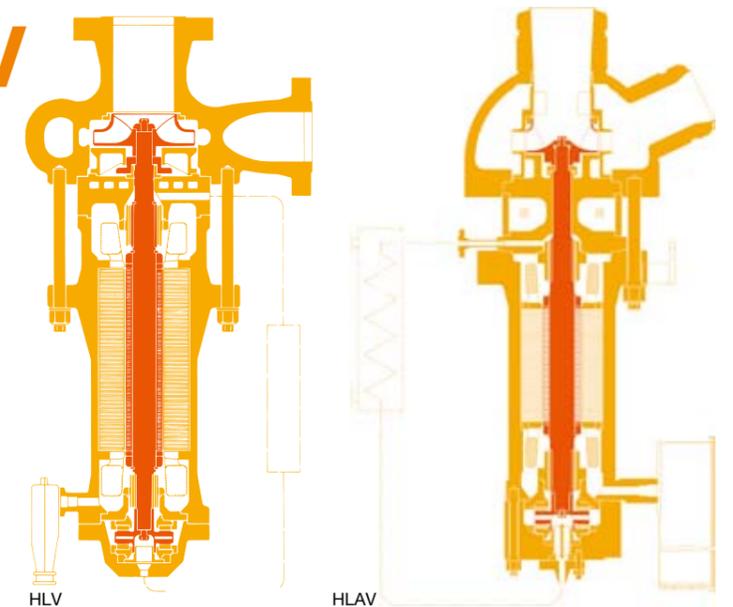
Size : 80 to 200mm (3 1/5 to 8in)  
 Capacity : up to 2,000m<sup>3</sup>/h (8,800USgpm)  
 Total Head : up to 4,200m (13,800ft)  
 Operating Pres. : up to 42MPa (6,090psi)  
 Operating Temp. : up to 230°C (446°F)  
 Speed : up to 7,000min<sup>-1</sup>



# HLV / HLAV

Glandless (sealless) pump motor unit

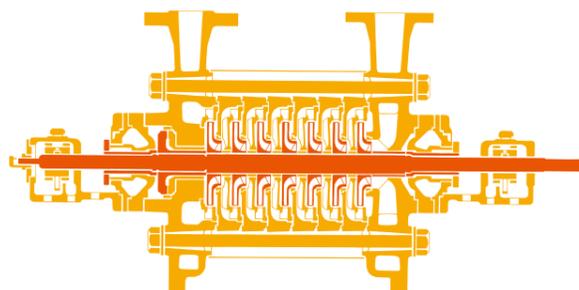
Size : 40 to 400mm (1 2/3 to 16in)  
 Capacity : up to 6,840m<sup>3</sup>/h (30,110USgpm)  
 Total Head : up to 180m (590ft)  
 Operating Pres. : up to 32MPa (4,640psi)  
 Operating Temp. : -10 to 420°C (-40 to 788°F)  
 Speed : up to 3,600min<sup>-1</sup>  
 Motor Rating : up to 2,500kW  
 Voltage : up to 11kV



# MHD

Horizontal multistage ring section pump

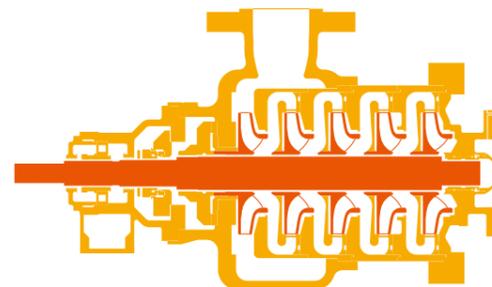
Size : 50 to 125mm (2 to 5in)  
 Capacity : up to 300m<sup>3</sup>/h (1,320USgpm)  
 Total Head : up to 1,200m (3,940ft)  
 Operating Pres. : up to 14.1MPa (2,045psi)  
 Operating Temp. : up to 180°C (356°F)  
 Speed : 6,300min<sup>-1</sup>



# MHA

Horizontal, end suction, multistage ring section pump

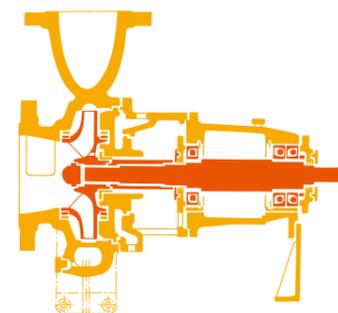
Size : 50 to 125mm (2 to 5in)  
 Capacity : up to 135m<sup>3</sup>/h (594USgpm)  
 Total Head : up to 700m (2,297ft)  
 Operating Temp. : up to 160°C (320°F)  
 Speed : up to 3,600min<sup>-1</sup>



# CPR

End-suction volute pump

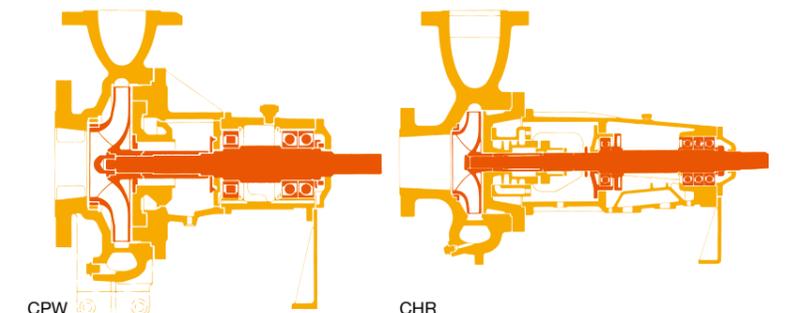
Size : 25 to 400mm (1 to 16in)  
 Capacity : up to 3,492m<sup>3</sup>/h (15,370USgpm)  
 Total Head : up to 270m (885ft)  
 Operating Pres. : up to 4MPa (580psi)  
 Operating Temp. : -70 to 400°C (-158 to 752°F)  
 Speed : up to 3,600min<sup>-1</sup>



# CPW / CHR

End-suction volute pump

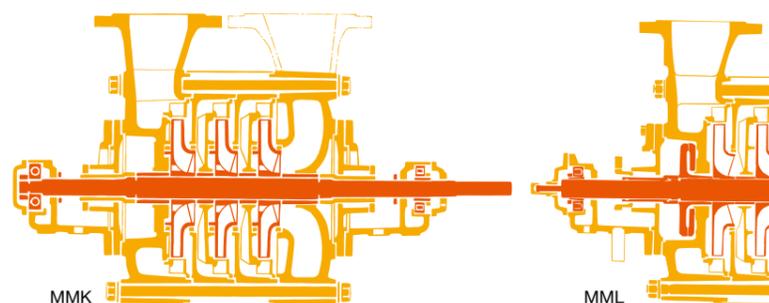
Size : 50 to 300mm (2 to 12in)  
 Capacity : up to 1,944m<sup>3</sup>/h (8,560USgpm)  
 Total Head : up to 125m (410ft)  
 Operating Pres. : up to 11MPa (1,595psi)  
 Operating Temp. : up to 300°C (572°F)  
 Speed : up to 3,600min<sup>-1</sup>



# MMK / MML

Horizontal multistage ring section pump

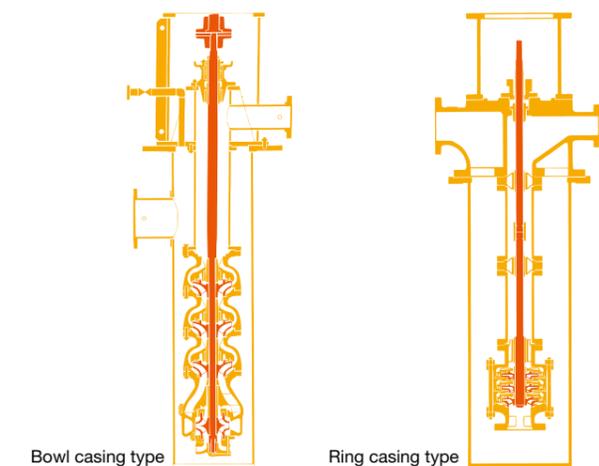
Size : 40 to 250mm (1 2/3 to 10in)  
 Capacity : up to 1,188m<sup>3</sup>/h (5,230USgpm)  
 Total Head : up to 780m (13,386ft)  
 Operating Pres. : up to 6.3MPa (914psi)  
 Operating Temp. : -10 to 230°C (-18 to 446°F)  
 Speed : up to 4,500min<sup>-1</sup>



# MMTV

Vertical mixed-flow multistage pump with canister

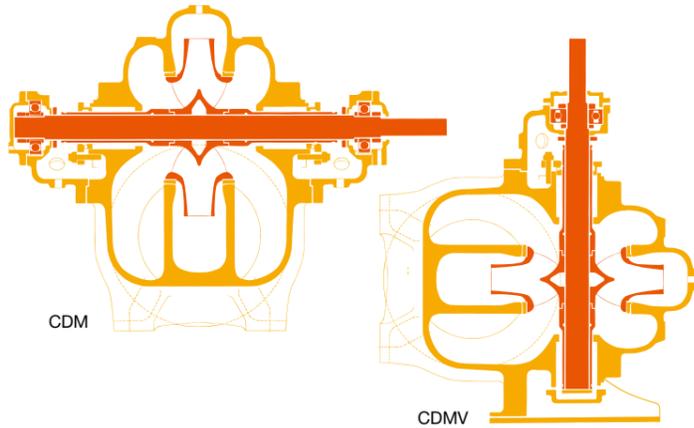
Size : 40 to 350mm (1 1/2 to 14in)  
 Capacity : up to 2,900m<sup>3</sup>/h (12,770USgpm)  
 Total Head : up to 490m (1600ft)  
 Operating Pres. : up to 4MPa (570psi)  
 Operating Temp. : up to 200°C (392°F)  
 Speed : up to 1,800min<sup>-1</sup>



## CDM

Horizontal axially split double-suction pump

Size : 150 to 2,000mm (6 to 80in)  
 Capacity : up to 36,000m<sup>3</sup>/h (158,510USgpm)  
 Total Head : up to 300m (980ft)  
 Operating Temp. : up to 80°C (176°F)  
 Speed : up to 3,600min<sup>-1</sup>



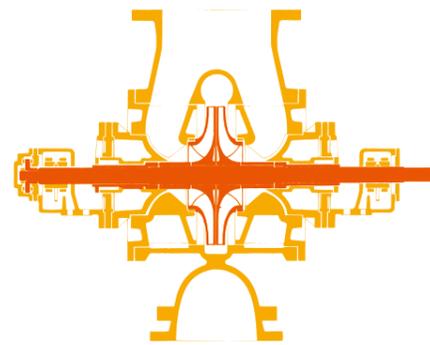
## CDMV

Vertical axially split double-suction pump

## CDKY / CDKS

Horizontal radially split double-suction pump

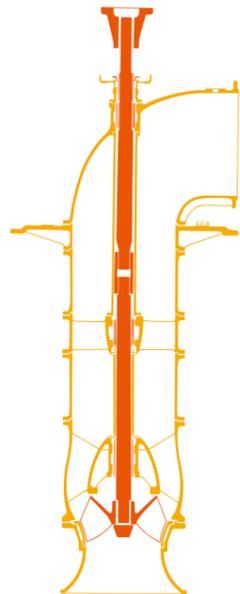
Size : 125 to 500mm (5 to 20in)  
 Capacity : up to 3,500m<sup>3</sup>/h (15,400USgpm)  
 Total Head : up to 320m (1,050ft)  
 Operating Pres. : up to 5MPa (725psi)  
 Operating Temp. : up to 210°C (410°F)  
 Speed : up to 3,600min<sup>-1</sup>



## SPV

Vertical mixed-flow pump

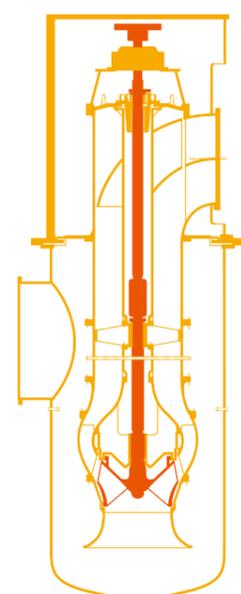
Size : 300 to 2,800mm (12 to 110in)  
 Capacity : up to 81,600m<sup>3</sup>/h (360,000USgpm)  
 Total Head : up to 100m (328ft)  
 Operating Pres. : up to 1MPa (145psi)  
 Operating Temp. : up to 80°C (176°F)  
 Speed : up to 1,800min<sup>-1</sup>



SPV

## SPTV

Vertical mixed-flow pump with canister

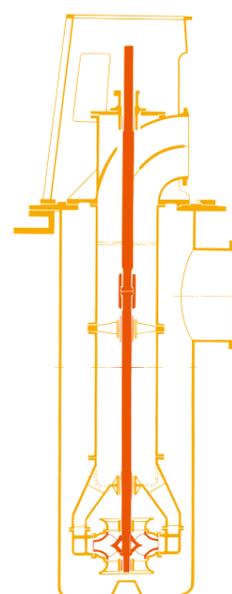


SPTV

## CDKTV

Vertical double-suction pump with canister

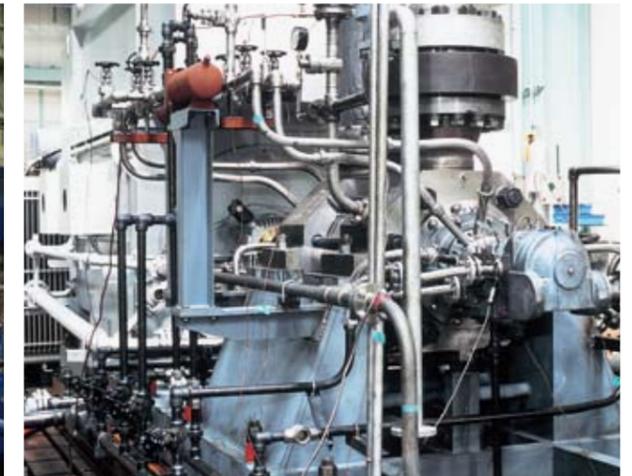
Size : 500 to 1,500mm (20 to 60in)  
 Capacity : up to 20,000m<sup>3</sup>/h (87,180USgpm)  
 Total Head : up to 100m (328ft)  
 Operating Temp. : up to 60°C (140°F)  
 Speed : up to 1,800min<sup>-1</sup>



## References



Qurayyah Combined Cycle Power Plant  
 5 x 266MW, Saudi Arabia  
 MHG ring section boiler feed pump



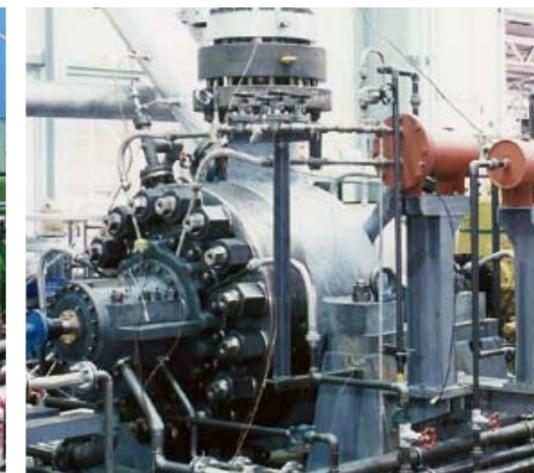
Fujairah Combined Cycle Power Plant  
 3 x 660MW, U.A.E.  
 MHG ring section boiler feed pump



Staythorpe C Combined Cycle Power Plant  
 4 x 400MW, U.K.  
 MHG ring section boiler feed pump



Pacifico Supercritical Coal Fired Power Plant  
 1 x 700MW, Mexico  
 MHB barrel type boiler feed pump [8.75MW drive]



Elbistan B Coal Fired Power Plant  
 4 x 360MW, Turkey  
 MHB barrel type boiler feed pump [12.6MW drive, 100% duty]

## References



Cirebon Supercritical Coal Fired Power Plant, 1 x 660MW, Indonesia  
 CDKY boiler feed booster pump (left front)  
 MHB barrel type boiler feed pump [15.3MW drive] (left back & right)



KSK Coal Fired Power Plant  
 6 x 660MW, India  
 HLAV spherical casing boiler circulation pump



Torishima understands the need to provide a high temperature and high pressure test loop for our boiler circulation pumps.



Bluewaters Coal Fired Power Plant  
 1 x 416MW, Australia  
 CDM cooling water pump



Altamira II Combined Cycle Power Plant  
 1 x 495MW, Mexico  
 MMTV condensate pump



Vung Ang 1 Coal Fired Power Plant  
 2 x 600MW, Vietnam  
 SPV cooling water pump



Polaris Geothermal Power Plant  
 72MW, Nicaragua  
 CDKTV hot well pump



Germencik Geothermal Power Plant  
 45MW, Turkey  
 CDKTV hot well pump