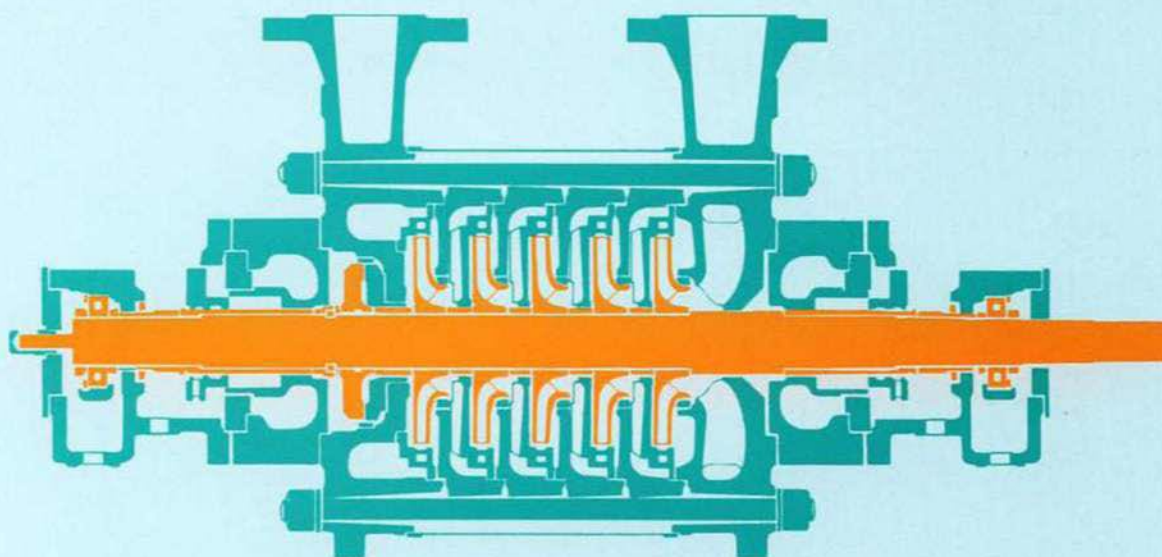


# MHD

Ring-Sectional High Pressure Pump



# APPLICATIONS

TORISHIMA model MHD series are ring-sectional, multi-stage type high pressure pump which have been developed from many experiences of manufacturing, supply and operation for power plant and also based on intensive R & D.

These high performance pumps have been applied high pressure service not only for boiler feeding with its superior reliability and economical operation.

## APPLICATIONS

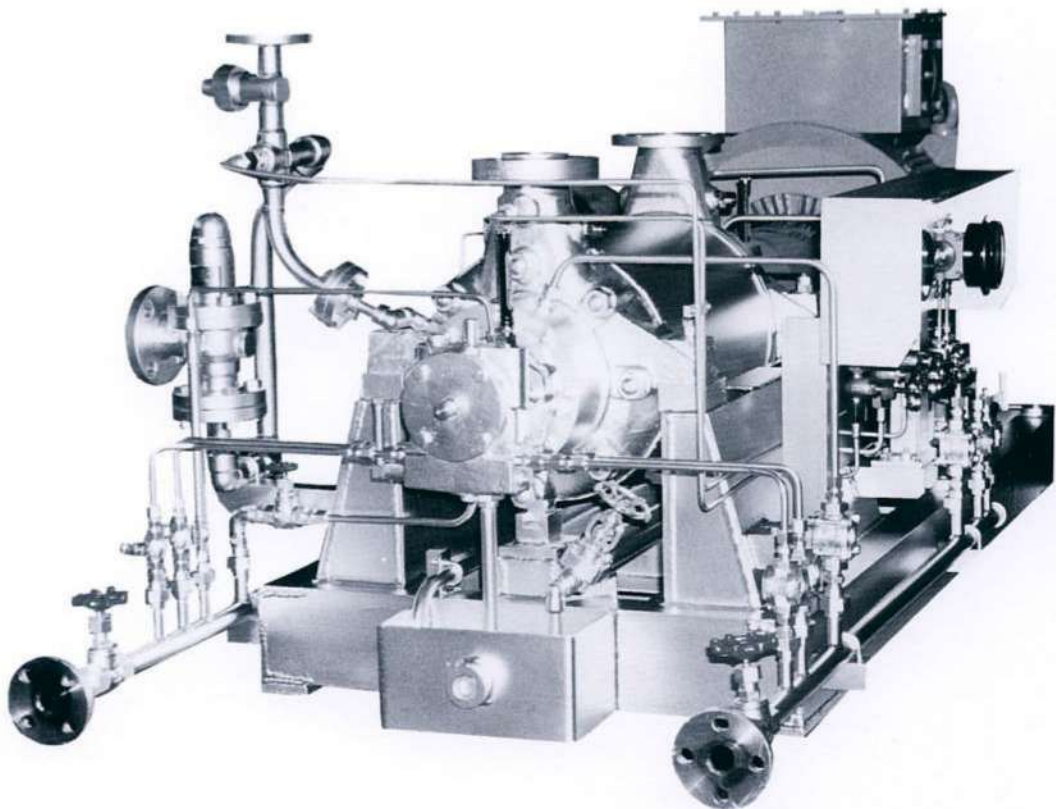
- Boiler feed
- Reverse osmosis water desalination
- High pressure service for all kind of industries

## LIQUID

- Fresh water
  - Hot water
  - Boiler feed water
  - Condensation
  - Sea water
- etc.

## FEATURE

- 1. High reliability and durability**  
High reliability and durability by superior materials and precise manufacturing know-how under strict quality control.
- 2. Excellent hydraulic characteristics**  
As the impeller and diffuser are designed to be high efficiency, low NPSH and stable head/capacity curves in wide range and effective operation is ensured.
- 3. Simple construction and easy maintenance**  
The construction is simplified and less components are used. Overhaul can be easily carried out.
- 4. Brief delivery**  
Under parts stock control system, these pumps are completely standardized for fast shipment.



# RATIONAL DESIGN

- Casing support at shaft centerline prevents vibration caused from the thermal expansion of suction/discharge casings.
- According to excellent hydraulic design and standardization, programs of products are excellent for NPSH, price and operating cost.
- The interface at the respective stages are sealed perfectly by metallic sealing faces with back-up O-rings and clamped together by strong tie bolts.

## Casing

Ring-sectional single casing  
Feet at shaft centreline

## Shaft seal

Packed gland  
Mechanical seal

## Impeller

Closed impeller of three dimensions

## Nozzle

Suction nozzle : Top  
Discharge nozzle : Top

## Bearings

Coupling side : Roller bearing  
Anti-coupling side : Roller bearing  
※Journal bearing can be supplied on request.

## Flange

JIS/ANSI/DIN

## Balancing device

The axial thrust is compensated by the balancing disc & seat at the discharge end of the pump.

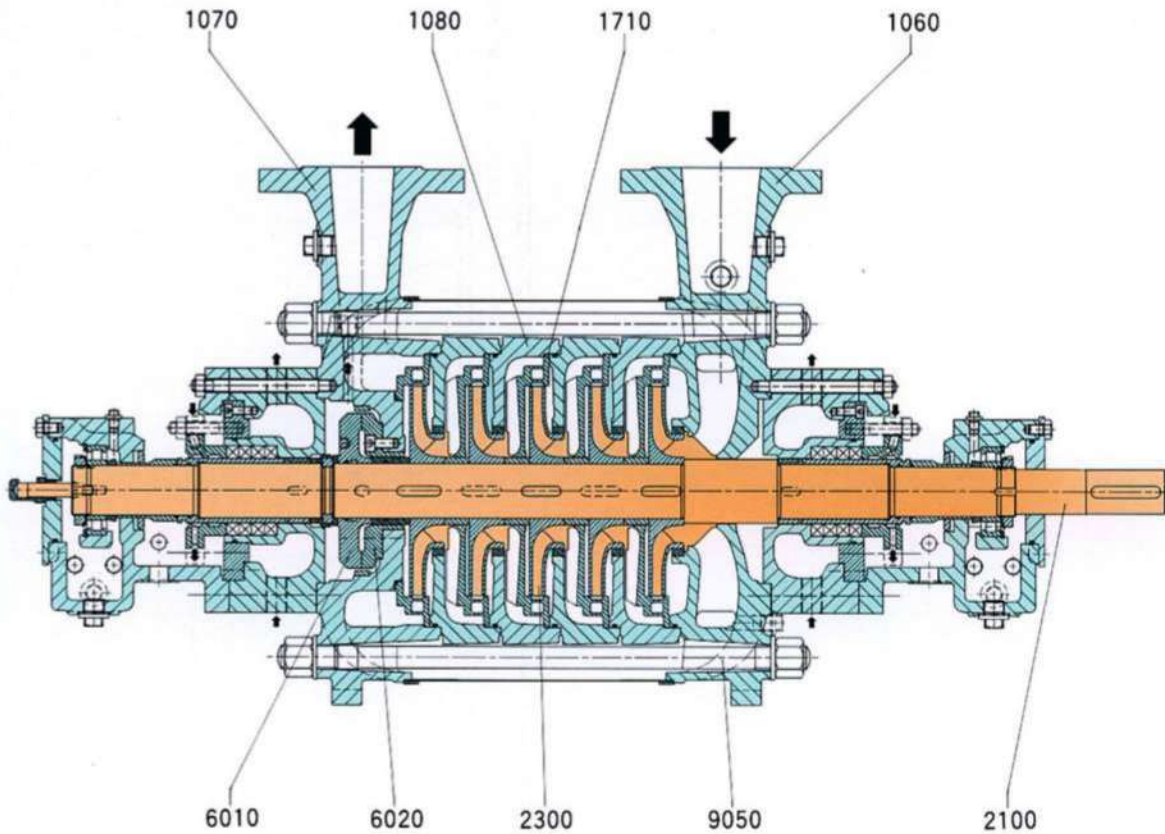
## Drive

Electric motor/Steam turbine/Engine

# APPLICATION RANGE

Discharge Nozzle	50 to 100mm
Capacity	Up to 215 m <sup>3</sup> /hr (Up to 60 l/s)
Max. suction pressure	Up to 30kgf/cm <sup>2</sup> G
Max. discharge pressure	Up to 90kgf/cm <sup>2</sup> G
Operating temperature	-10°C to 200°C

# SECTIONAL DRAWING



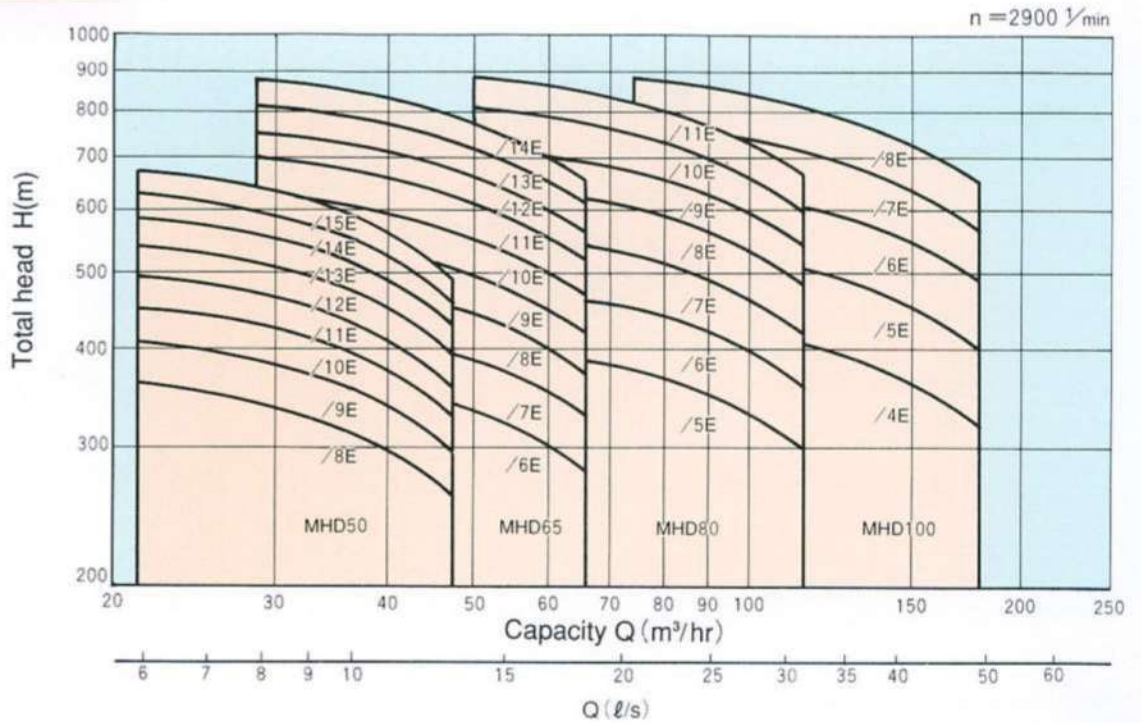
## ■ MATERIALS(Main parts)

Parts No.	Parts designation	Materials
1060	Suction casing	Cast Iron, Ni-Cr Cast Iron, Ductile Cast Iron, Cast Steel
1070	Discharge casing	Cast Steel
1080	Stage casing	Cast Iron, Ni-Cr Cast Iron, Ductile Cast Iron, Cast Steel
1710	Diffuser	Cast Iron, Ni-Cr Cast Iron, Cast Bronze, 13% Chrome Steel
2100	Shaft	Carbon Steel, Stainless Steel
2300	Impeller	Cast Iron, Ni-Cr Cast Iron, Cast Bronze, 13% Chrome Steel
6010	Balancing disk	Stainless Steel
6020	Balancing disk seat	Stainless Steel
9050	Tie bolt	Nickel Chrome Molybden Steel

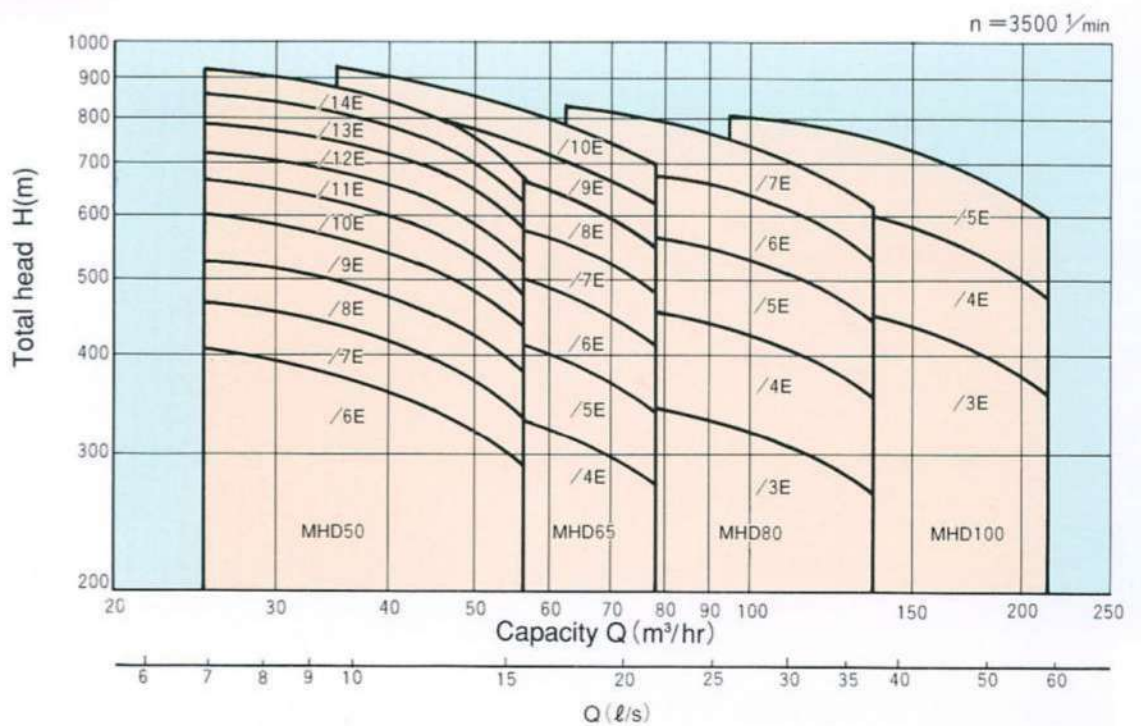
Note: ● The materials of parts are changeable according to liquid and temperature.  
 ● 18% chrome steel can be supplied on request.

# SELECTION CHARTS

**50Hz**  
**2P**



**60Hz**  
**2P**



## Bleeding from stage casing

If situation requires lower pressurized water than the discharge pressure of the pump, ring-sectional casing pumps can be easily extracted the pressurized water from suitable middle casing or casings by an extraction pipe in necessary.

## Start-up from ambient temperature condition

At the ring-sectional single casing pump it is possible to start-up quickly and not necessary to warm the pump from cold water or ambient in principle.

Fig.1 shows distortion of pump for difference of temperature. In general, upper part expands more than lower part because of difference of temperature inside the pump casing. Since this type pump casings are tightened each other by strong tie-bolts outside to prevent for the above mentioned influence, even large size pump can start up from the cold water without warming.

(Warming or circulator can be supplied on request.)

## Overheat preventive device

To prevent for the overheat of pump, two types of overheat preventive device that control for allowable minimum discharge can be supplied as follows.

### (1) Relief device (Fig.2-1)

Even at normal discharge quantity where is no possibility of temperature rise, this device relieves water continuously into the suction tank.

Hence, energy loss is big and operation cost becomes higher, but very simple in construction. (In determination of pump capacity, relief quantity must be added to the special flow rate.)

### (2) Check valve with auto relief valve (Fig.2-2)

With a pump is in normal running, a relief line is closed, and when the discharge quantity comes down to mini-flow range, the relief line is automatically opened/closed according to discharge quantity.

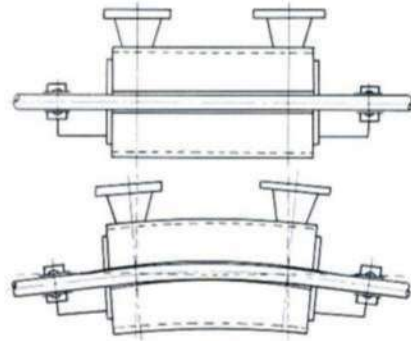


Fig.1 Distortion of pump caused by difference of temperature

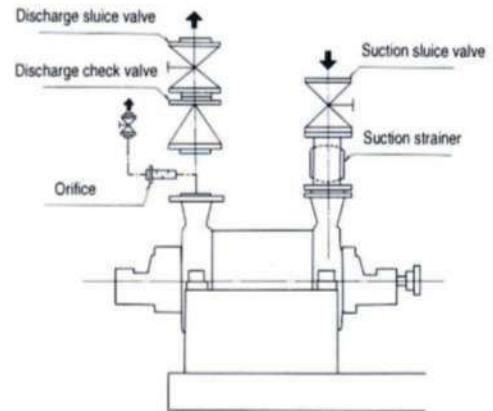


Fig.2-1 Relief valve

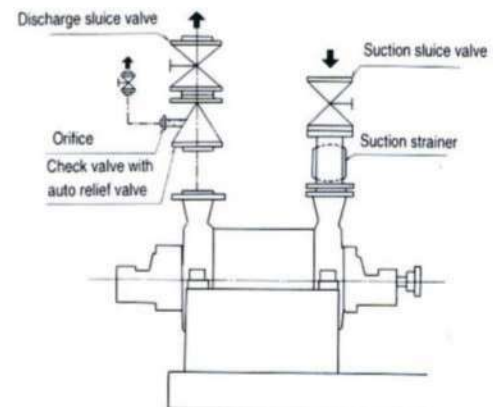


Fig.2-2 Check valve with auto relief valve



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