

MPPTECH
MACHINERY POWER PLANT

*your specialist
for steam turbines*



TURBINE CONTROL SYSTEM TurbCSD

Dependable Turbine Control

TURBINE CONTROL WITH TURBCSD™

MPPTech GmbH has developed the TurbCSD™ Turbine control system (TurbCSD™) to the highest technical standards for reliability, scalability and performance in an uncomplicated design. This plant-wide safety monitoring system, representing the accumulation of over 40 years of experience in control equipment, has been designed in close cooperation with both machine manufacturers and end-users. The system is also fully supported by our renowned worldwide sales and support network to ensure all components are optimally selected, installed and commissioned to satisfy the client's requirements for the most demanding applications.

WIDE REACHING APPLICATIONS

The TurbCSD™ continuously monitors and controls speed and process signals - like pressure, flow, etc., from permanently installed sensors on machines in a number of different industries, such as the oil & gas, petrochemical, power and other heavy process industries. It is scalable and can be used as a plant wide control system covering a wide range of machines such as steam turbines, hydro turbines, axial, centrifugal and reciprocal compressors, motors and generators, pumps, ventilators, extruders, agitators, etc. It is well suited for both machine OEM installations and new or retrofit end-user installations.

One of the important applications for the TurbCSD™ is replacing the growing number of ageing control systems in the market; many of which are obsolete or no longer reliable. As **MPP**Tech is completely independent from machine manufacturers, unbiased control solutions can be provided to both OEM suppliers and end-users. The TurbCSD™ is compliant with many international standards and is designed to be highly compatible with existing installations, thus simplifying retrofits.

Powerful communications capability allows the TurbCSD™ to be interfaced to most process control systems for visualization without jeopardizing its safety controls functionality. Of course the TurbCSD™ can also be used as the data acquisition platform with the Centrol™ Operation Monitoring system.

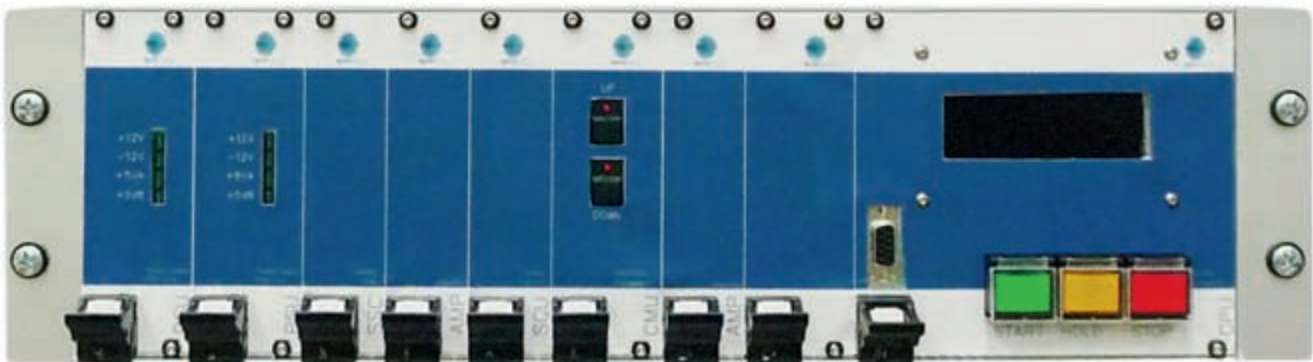
MOST IMPORTANTLY,

the TurbCSD™ is based on a modular application design concept that allows it to cost effectively fit most monitoring applications with minimal setup.

High reliability with powerful performance and technology are our contribution enabling our customers to reach there goals.



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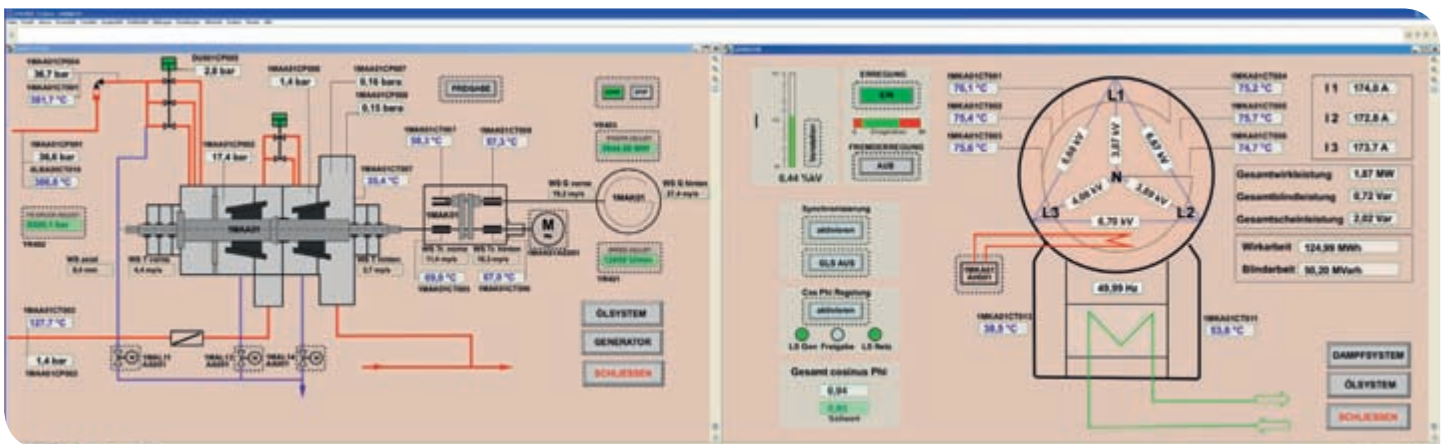


ADVANTAGES

- **Improvement of machine lifetime**
Automatic start-up and load increase curve
- **Improvement of machine efficiency**
Self regulating to optimal working point
- **Shorter down time**
Controlling modules work completely independently of one another
- **No maintenance required**
Every single part is chosen to be in strict conformity with relevant norms and individually tested to the leading standards
- **Long guarantee period**
Highest quality standards and high design overload
- **Human error minimized**
Fully automated and individualized help text for alarm indication
- **Attractive ROI**
Shorter Return On Investment period because of greater machine efficiency, lower maintenance requirements, and less chance of expensive breakdowns

VISUAL CONTROL & GRAPHIC DISPLAY OPTIONS

The CENTROL™ Platform meets all turbine process control requirements with regard to operation and observation. Several TurbcSD™ units can be connected to a plant wide sophisticated graphic display of turbine related process values.



BENEFITS

- Virtual control and graphic displays increase significantly the clarity of the process, simplifying operation.
- In combination with individualized help text for alarm indication, it guides and supports control operator's staff.

ARCHIVING AND EXPORT

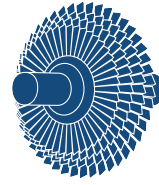
Archiving of trend display records and historical data export.

EVENT MANAGEMENT

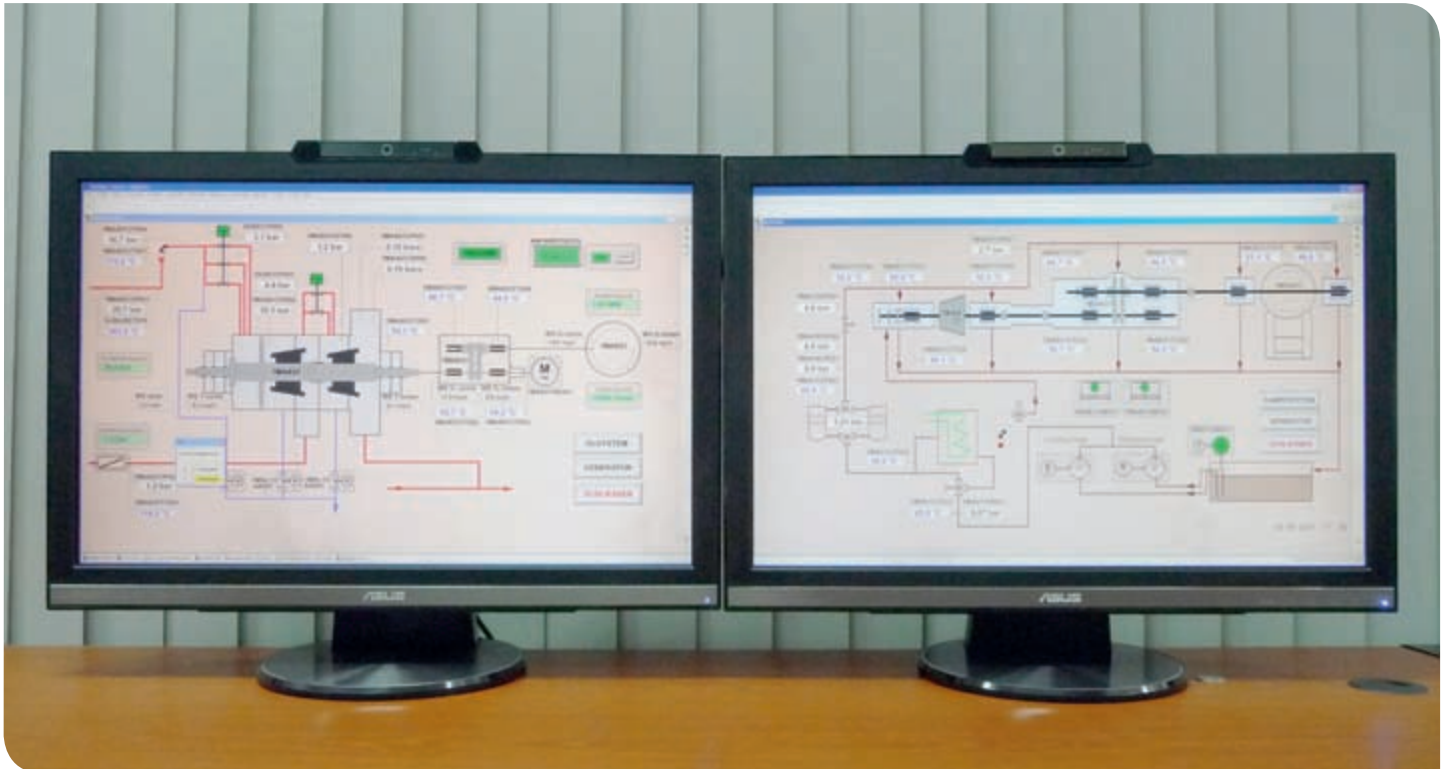
- Alarm list, alarm history, alarm protocol
- Viewing, acknowledgement, protocol, print and export functions of events.
- Individually configured help text for every alarm indication

PROCESS DATA DISTRIBUTION

- Central Control provides process values via Intranet
- On request - as well via Internet.



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TYPICAL CONTROL AND GRAPHIC DISPLAY SET-UP

MULTIPLE MONITOR OPERATION

Support for graphic display on up to four monitors per operator station.

Amongst other things, Central Control offers the following graphic display options

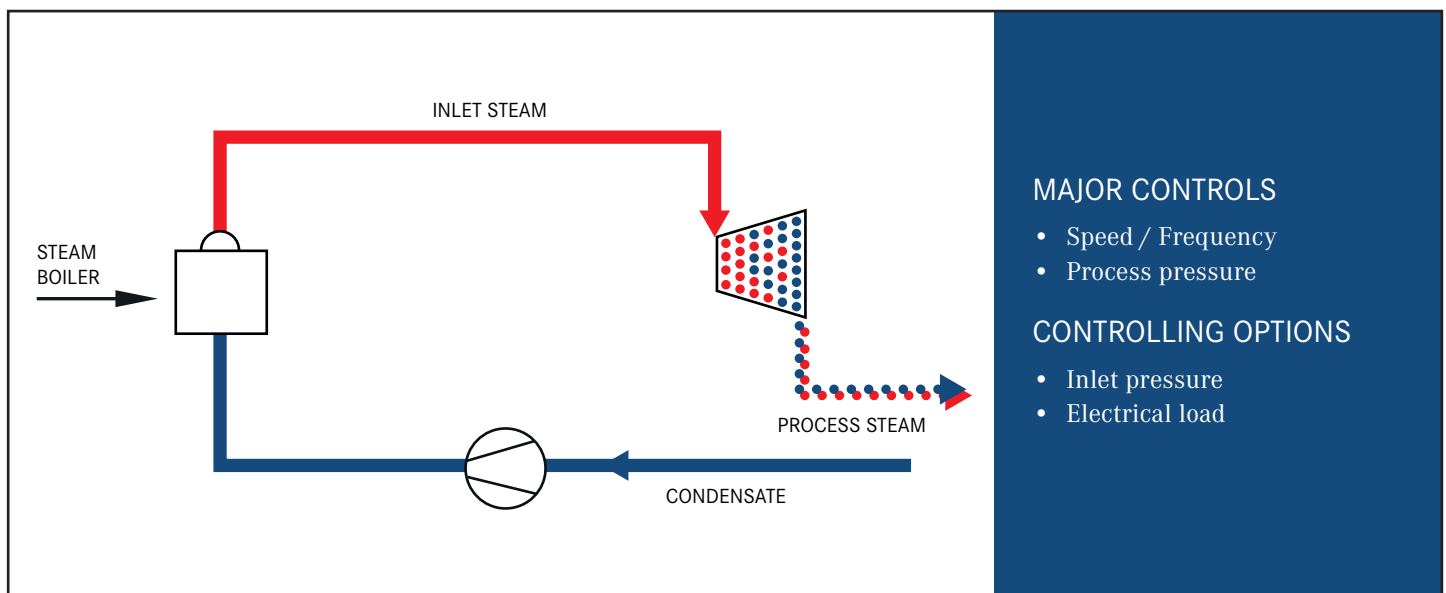
- Clearly structured faceplates for operator interventions (which can also be combined as required in group displays)
- Trend displays including historical data and long-term archiving
- Alarm pages for specific plant areas, sequence control displays, shift logs, event logs and data archiving
- Standardized system display for system hardware diagnostics
- Graphic displays that besides standard graphic elements are also supported by bitmaps and a 3D macro library
- Individual aspect ratio and positioning of interlocking displays
- Fully flexible on resolution and aspect ratio of displays/monitors

CONFIGURATION DEPENDING ON YOUR REQUIREMENT

BACKPRESSURE TURBINE

Industrial plants with process steam requirements are increasingly choosing to install backpressure steam turbine generator sets. This allows the effective use of the available energy, producing both process steam and additional electrical power.

The turbine operation is typically dependent upon the steam requirements of the process being fed. This is then referred to as thermally controlled operation.



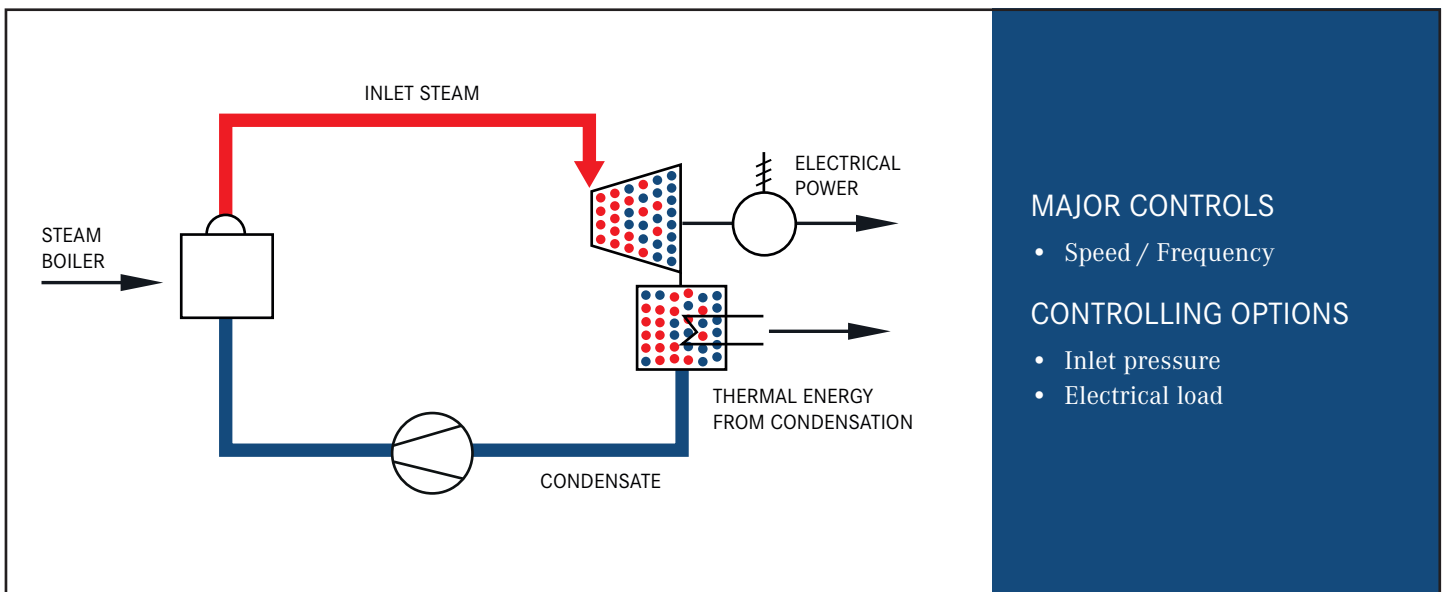
RELATED TURBCSD™ COMBINATIONS

Type	Independent / autonomous controls			
	Speed/Frequency	Process pressure	Inlet pressure	Electrical load
TurbCSD™				
2s1E2A	X	X		
2s2E2A	X	X	X	
2s2E2A	X	X		X
2s3E2A	X	X	X	X



CONDENSING TURBINE

The primary function of a condensing turbine generator set is the generation of electrical power. The specific requirements to be fulfilled by this type of turbine include high turbine efficiency, high availability, low maintenance costs and ultimately a high level of economic efficiency. This is referred to as power-mode operation.



MAJOR CONTROLS

- Speed / Frequency

CONTROLLING OPTIONS

- Inlet pressure
- Electrical load

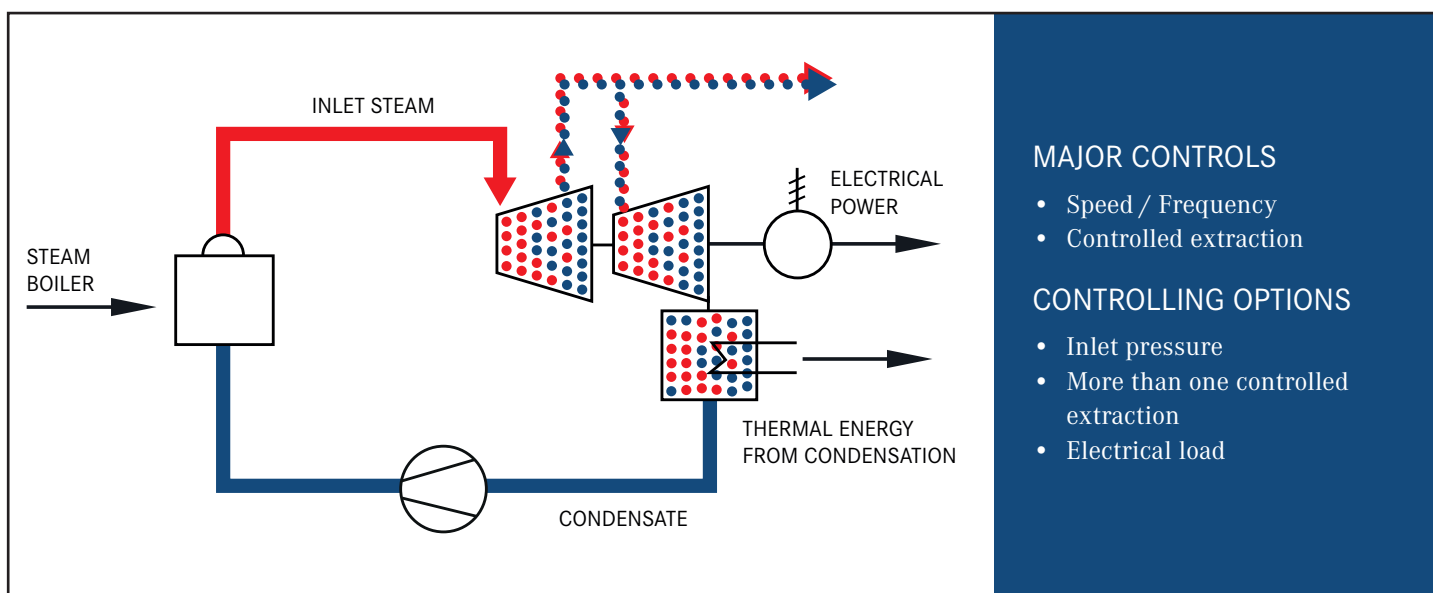
RELATED TURBCSD™ COMBINATIONS

Type	Independent / autonomous controls		
	Speed/Frequency	Process pressure	Inlet pressure
TurbCSD™			
2s2A	X		
2s1E2A	X	X	
2s2E2A	X	X	X

CONFIGURATION DEPENDING ON YOUR REQUIREMENT

EXTRACTION TURBINES

In many applications, the optimum configuration is achieved by fitting the turbine with steam extraction connections. Our TurbCSD™ can be fitted with extractions pressure control in a manner to suit the optimum process, including adjustable bleeds (“Wanderanzapfung”) to improve the partial load behavior. Within the technical limits, we offer you the option to vary the controls to find the best mix for your process steam requirements.



RELATED TURBCSD™ COMBINATIONS

Type	Independent / autonomous controls			
	Speed/Frequency	Extraction pressure	Inlet pressure	Electrical load
TurbCSD™				
2s1E3A	X	X		
2s2E3A	X	X	X	
2s2E3A	X	X		X
2s3E3A	X	X	X	X
2s2E4A	X	2X		
2s3E4A	X	2X	X	
2s4E4A	X	2X	X	X

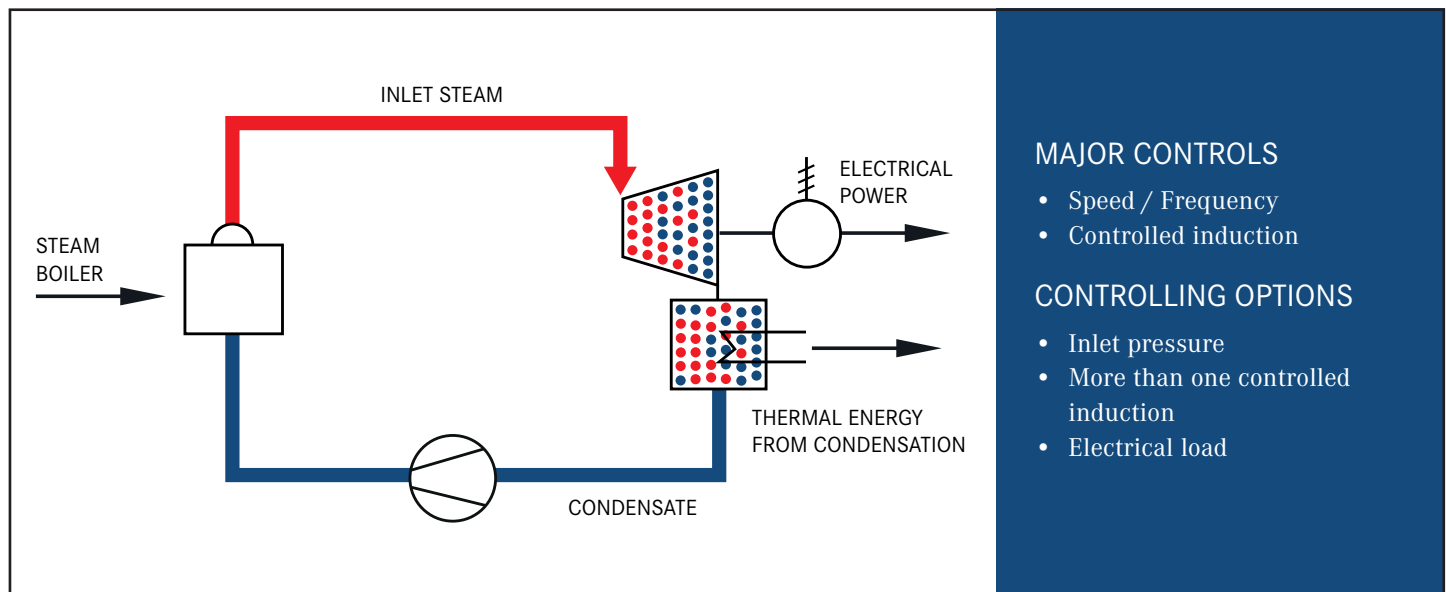


TURBINES WITH INDUCTION

Our TurbCSD™ can also be fitted with controls for inductions if steam volumes are produced at various pressure levels. In this arrangement the turbine steam is supplied in a center stage.

Typical application scenarios for induction steam include waste heat-recovery processes, and turbines which can be used for converting residual steam volumes from the production processes into electricity.

The inductions are integrated into the turbines and can be used as throttle or multi-valve control installations. If required we provide combinations of controlled inductions and controlled extractions.



RELATED TURBCSD™ COMBINATIONS

Type	Independent / autonomous controls			
	Speed/Frequency	Induction pressure	Inlet pressure	Electrical load
TurbCSD™				
2s1E3A	X	X		
2s2E3A	X	X	X	
2s2E3A	X	X		X
2s3E3A	X	X	X	X
2s2E4A	X	2X		
2s3E4A	X	2X	X	
2s4E4A	X	2X	X	X

CONFIGURATION DEPENDING ON YOUR REQUIREMENT

ORDERING INFORMATION

Model Number Legend

TURBCSD

NUMBER OF AMPLIFIERS FEEDING ELECTRIC ACTUATORS

(for each I/H converter which controls 1 steam valve of
steam valve groups)

2A ... 1 safety stop valve and 1 steam control valve

3A ... 1 safety stop valve and 2 steam control valves

NUMBER OF CONTROLLED PROCESS VALUES

(e.g. inlet-, extraction-, induction-, process steam pressure, electrical load, ...)

1E ... e.g. 1 inlet pressure or 1 electric load,

2E ... e.g. 1 inlet pressure and 1 electric load,

3E ... e.g. 1 inlet-, 1 extraction- and 1 induction pressure

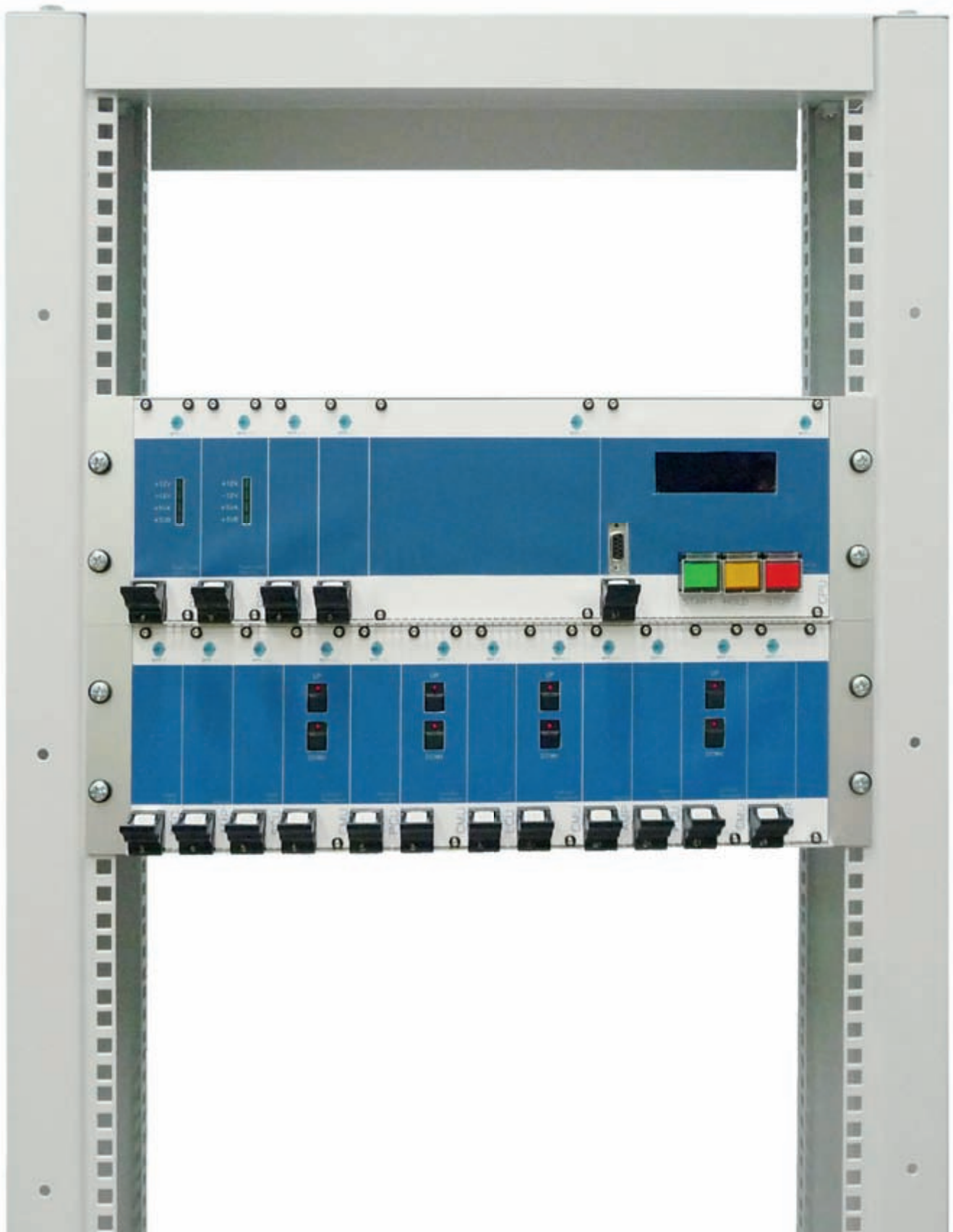
NUMBER OF SPEED SENSORS

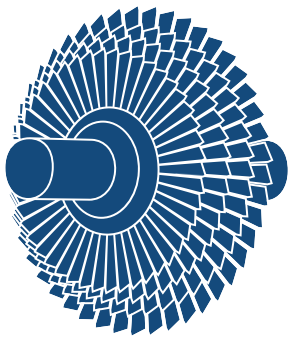
(e.g. inductive proximity switches, pulse sensors, ...)

2s ... 3 speed sensors, 2 are used as PV for control



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