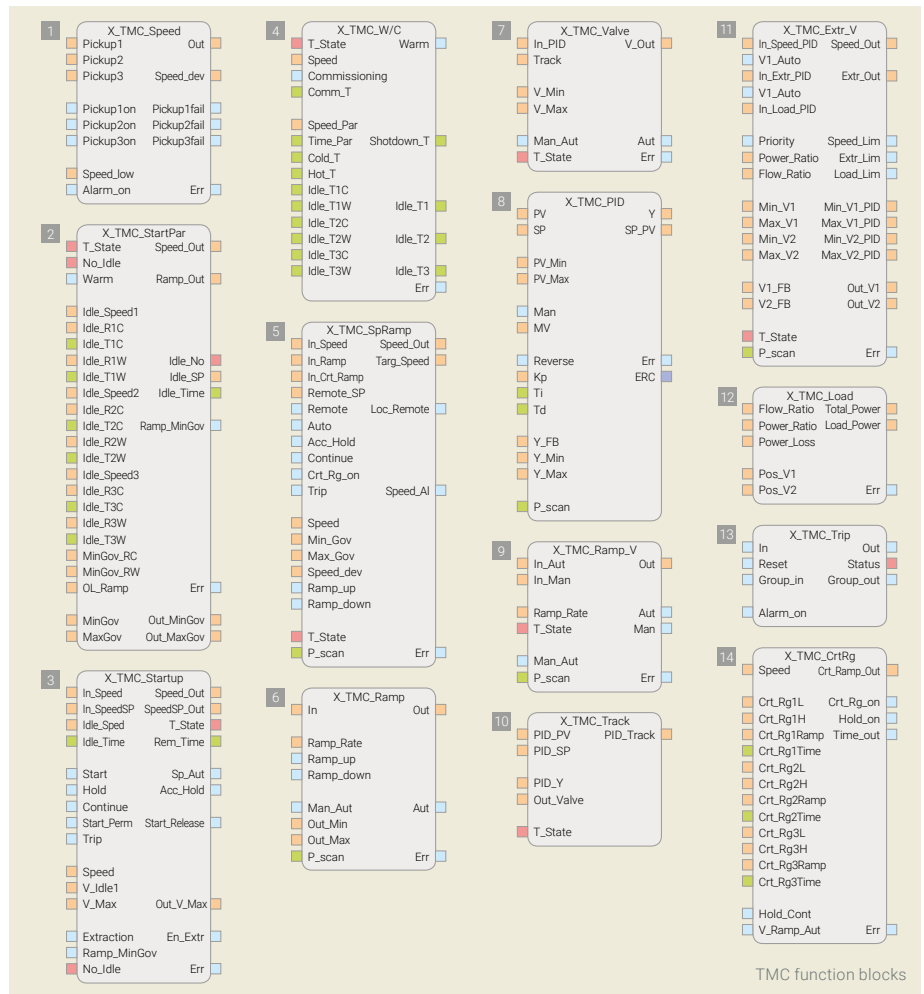




# HIMA TMC Function Blocks Accelerate the Start-up of Turbines

These standardized function blocks were developed specifically for the regulation and monitoring of steam turbines. The HIMax safety system thus makes it possible to automate a turbine without having to independently carry out time-intensive programming - thus making it possible to streamline the steam turbine commissioning.

In combination with the compressors and other function blocks from the standard SILworX function block library (e.g., ramp blocks, interpolation blocks, or PID controller); it is now possible to implement the complete operation of compressors and turbines.



**Part Number**  
89 5650004:  
X\_TMC\_DT\_Lib Function block library consisting of 14 function blocks for a standardized system of control, monitoring and operation of steam turbines

**Benefits**

**Safety Benefits**

- Tested pre-programmed solutions mean fewer programming errors
- Fault prevention measures according to international safety standards

**Cost Benefits**

- Reduced programming effort
- Reduced testing costs through pre-tested functions
- Quick commissioning due to fault prevention

**Operating Benefits**

- Re-usable programs for projects with similar parameters
- Facilitation of projecting due to fully proven TMC functions
- SILworX online help for configuring the function blocks
- The complete documentation is imported while the function block library is imported to SILworX

## The 14 Function Blocks Support the Complete Turbine Program:

- Start-up and operation of steam turbines, taking into account the current warming
- Managing ramps and critical zones
- Speed and extraction-steam control
- Multi-stage steam turbine load calculations
- Trip functionalities

1	<b>X_TMC_Speed</b>	Max. selection and protection of speed (3 pickups).
2	<b>X_TMC_StartPar</b>	Default values speed, timer and acceleration for warm and cold starts, without critical speed.
3	<b>X_TMC_Startup</b>	Fixes all conditions and calculates values for start-up.
4	<b>X_TMC_W/C</b>	Interpolate values for long warming-up timers (3 idle levels).
5	<b>X_TMC_SpRamp</b>	Ramps and default for speed control.
6	<b>X_TMC_Ramp</b>	Ramps up/down with manual/automatic
7	<b>X_TMC_Valve</b>	Selection with fixed switchover of 2 analogue values.
8	<b>X_TMC_PID</b>	PID-control.
9	<b>X_TMC_Ramp_V</b>	Valve block for single-stage steam turbine.
10	<b>X_TMC_Track</b>	Valve block for double-stage steam turbine (extraction/admission).
11	<b>X_TMC_Extr_V</b>	Switchover steam valve, recirculation control/ramp.
12	<b>X_TMC_Load</b>	Load calculation for double-stage steam turbine.
13	<b>X_TMC_Trip</b>	Trip block with release, reset and first out.
14	<b>X_TMC_CrtRg</b>	Managed start-up through critical speed zones.

**The function blocks for steam turbines are component parts of the HIMA complete solution FlexSILon TMC.**

- Control: start-up, operation, manual functions, shut down, etc.
- Regulation: speed control, steam distribution, power control and distribution, etc.
- Monitoring and protection: overspeed trip, bearing, temperature, pressure, etc.

**Engineering Tool**

SILworX is the fully integrated configuration, programming and diagnostic tool from HIMA.

**Safety System**

The HIMax safety system from HIMA provides the required performance for controlling, regulating, monitoring, and protecting turbo machines.



HIMax®

**Functional Safety**

HIMax and SILworX can be used in applications up to SIL 3 in accordance with:

- IEC 61508
- IEC 61511
- EN 62061

Also usable up to PL e in accordance with EN ISO 13849.