Advanced Energy®

THYRO-STEP CONTROLLER
LOAD-SEQUENCING DEVICE

Load-sequencing controllers

The Thyro-Step Controller combines the features of a load-sequencing control (10+1 circuits) with the traditional tasks of a monitoring system for mains load peaks, data logging, and a control system. In addition, it serves as an I/O module.

The Thyro-Step Controller enables the installation of large, digitally-controlled heating systems using low-cost components. It intelligently balances usage of the connected switching and heating elements, resulting in lower installation costs, longer heating-element life, and lower operating costs.

Features

- › **Ten potential-free relay/thyristor switch connections**
- › **Analog output to power controller**
- › **Supply voltage 110 V/230 V; 50/60 Hz**
- › **Easy to use (switch and potentiometer)**
- › **RS-232 PC connection**
- › **Configuration options via PC software**
- › **Adjustable ramp functions**
- › **Hysteresis function (automatic/manual)**
- › **Error and alarm signal output**
- › **Connection options at fieldbus level[1]**
- › **Replaces three former ZME cards**
- › **Device protection via integrated safety fuse**

Typical Applications

- › **Petrochemical industry (heavy fuel and gas heaters)**
- › **Chemical industry**
- › **Pipe/trace heating**
- › **Furnace construction**
- › **Machine building**
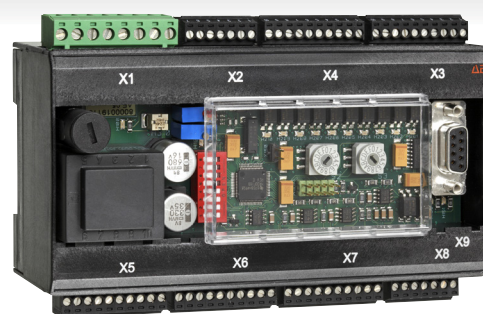
The Thyro-Step Controller can be used with large process heating systems arranged into separate zones or heater banks. For load-sequencing control, it balances temperature demand by switching on the specific banks or elements via relays or thyristor switches that most nearly match that demand. A Thyro-S®, Thyro-A®, Thyro-AX®, or Thyro-PX® digital SCR power controller can be installed at the analog output of the Thyro-Step Controller, enabling a gentle switchover between stages and continuous automatic adjustments during the process. Ramp times and hysteresis functions can be adjusted as required.

Adjust parameters via turn switches and potentiometers or via PC software. Connect your Thyro-Step Controller to a PC via an integrated RS-232 interface or link it to process and automation technlogy via bus module.[1]

1 Pending

ADDITIONAL OPTIONS

› Mains load peak monitoring
› Adjustable integration time
› Power and energy measurement
› Supply voltage and temperature measurement
› Integrated operating hour meter

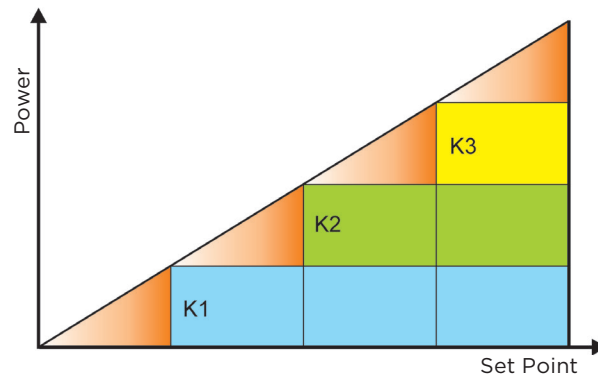Figure 1. Load sequencing control (e.g. 3+1 circuits)

CERTIFICATES

› Quality standard DIN ISO 9001
› Complies with CE directives
› Complies with RoHS, 5/6

SPECIAL FUNCTIONS

Rotating Switch Function

This mode of operation balances the wear and tear of all switches and connected loads, such as contactors and heating elements. Each switching element is loaded with the same number of operating cycles.

Rotating Time Function

This mode of operation balances usage of connected loads, such as heating elements. It switches automatically to another stage after an adjustable time period, such as six hours. This function is especially suited for processes with constant operating points.

Rotating Quick-Time Function

This mode of operation balances spatial heating of a medium. It is specially suited for symmetrical arrangements of heating elements with successive rotation of all stages after an adjustable time period, such as two seconds. Non-wearing thyristor switches (Thyro-S) are preferred here.
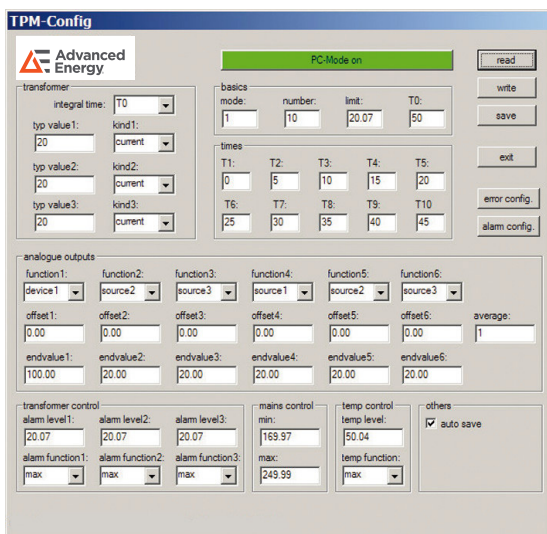

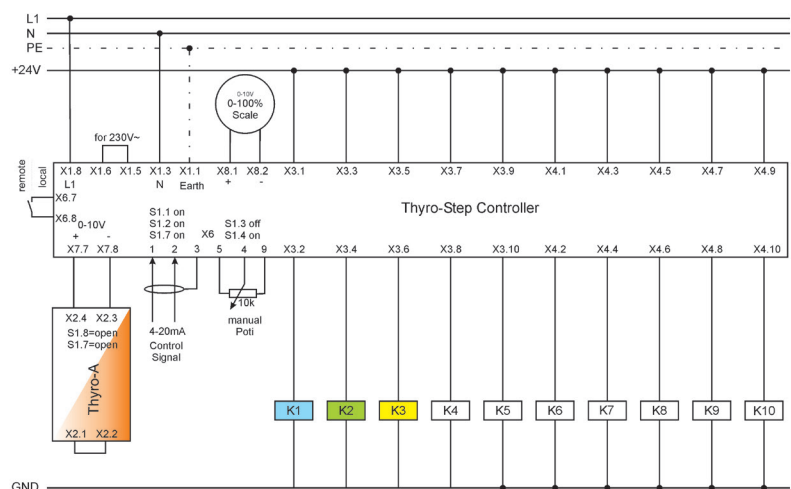Figure 2. Thyro-Step Controller configuration screen

Figure 3. Thyro-Step Controller system diagram

SPECIFICATIONS

Technical Data

Operating Mode	Load sequencing control (10+1 circuits)
Special Functions	Rotating switch Rotating time Rotating quick time Emergency stop Down ramp off
Additional Options	System monitoring for mains load peaks Data logging and control system I/O module
Mains Voltage X1	AC 230 V -15% up to +10% AC 110 V -15% up to +10%
Power Consumption	1.5 W
Internal Fuse	T 1 A 250 V
Mains Frequency	47 to 63 Hz
Digital Outputs X3 and X4	10 galvanically isolated optocoupler outputs Max DC 30 V Max 15 mA
Error and Alarm Output X8	2 galvanically isolated optocoupler outputs Max DC 30 V Max 15 mA

Analog Outputs X7 and X8 (6 Analog Outputs)

Output Area	0 to 10 V
Max Current	1 mA
Output Accuracy	±1%[2]

Analog AC Inputs X5 and X6 (3 Analog Inputs)	Range	Ri
Inputs 1 and 2 **X6.1 and X6.4**	0/2 to 10 V 0/1 to 5 V 0/4 to 20 mA	88 kΩ 44 kΩ 250 Ω
Input 3 **X5.10**	0/1 to 10 V	88 kΩ

Analog AC Inputs X5 (3 Analog Inputs)	Range	Ri
Inputs 1 and 3	0 to 1 V~	7540 kΩ

Measuring Accuracy

Supply Voltage	±3%[2]
DC Inputs	±1%[2]
AC Inputs	±2%[2]

Signals and Connections

Status Signals	14 LEDs for operating, error and alarm signals
PC Interface	RS-232
Bus Connection X2[1]	Optional bus module for Profibus® DP, Modbus® RTU, DeviceNet™, CANopen®, Profinet®, Modbus® TCP/IP, Ethernet/IP®

1 Pending

2 Based on final value

Mechanical Specifications

Dimensions (W x H x D)	150 mm x 95 mm x 60 mm; 5.9″ x 3.7″ x 2.4″		
Weight	0.35 kg (0.77 lb)		
Built-in Unit	EN 50 178		
General Requirements	DIN EN 60 146-1-1:12.97		
Conditions of Operation	DIN EN 60 146-1-1; K. 2.5		
Location	Industrial area; CISPR 6		
Temperature Performance	EN 60 146-1-1; K. 2.2		
	Storage temperature	D	-25 to +55°C
	Transport temperature	E	-25 to +70°C
	Operating temperature	(better than B)	-10 to +55°C
Humidity Classification	B	DIN EN 50 178 Tab. 7 (EN 60 721)	
Pollution Level	2	DIN EN 50 178 Tab. 2	
Air Pressure	900 mbar	Corresponds to max 1000 m above	
Protection Type	IP00	DIN EN 69 529	
Protection Rating	III	DIN EN 50 178 Kap. 3	
Shock Resistance	DIN EN 50 178 Kap. 6.2.1		
Inspections	According to DIN EN 60 146-1-1 4		
EMC Emitted Interferences	DIN EN 61000-6-4		
Radio Interference Supression	Class A	DIN EN 55011:3.91 CISPR 11	
EMC Interference Resistance	EN 61000-6-2		
ESD	8 kV (A)	EN 61000-4-4	
Burst Control Lines	1 kV (A) EN 61000	EN 61000-4-6	
Line Bound	EN 61000-4-6		
Power Supply Unit (Fixed on Top-of-Hat Rails)	230 V/24 VDC with 1 A (24 W)		
Relay 24 VDC with Clamp (Can Be Fixed)	1 change over contact, hard gold-plated, 250 V/6 A		

**For international contact information, visit
advanced-energy.com.**

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Advanced Energy](#):
  [2000002501](#)