Advanced Energy

THYRO-POWER MANAGER

STATIC MAINS LOAD OPTIMIZATION ADD-ON UNIT

Static mains load optimization for homogenous power consumption with parallel-operating power controllers

The Thyro-Power Manager (TPM) is an add-on unit for static mains load optimization that increases power consumption homogeneity for configurations of two to ten power controllers in full-wave switch (TAKT) operating mode. It also monitors mains load peaks, measures and controls data, and serves as an I/O module.

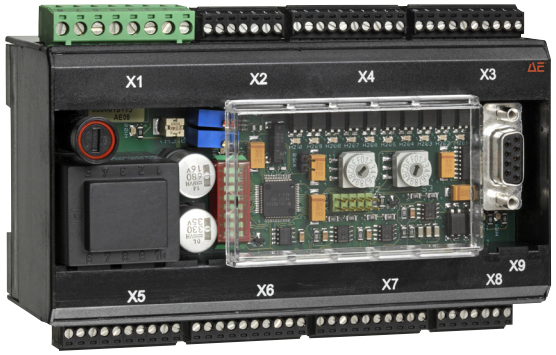
Using static mains load optimization, the Thyro-Power Manager balances power distribution in parallel-operating Thyro-S®, Thyro-A®, Thyro-AX®, and Thyro-PX® power controllers. It enables individual controllers to turn on and off consecutively, providing almost completely homogenous power consumption over time.

Features

- Static mains load optimization (automatic/manual)
- Ten isolated connections for SCR power controllers
- Power supply 110 V/230 V; 50/60 Hz
- Easy operation (switch and potentiometer)
- Configuration possibilities via PC program
- Error and alarm output
- RS-232 PC connection
- Connections at field bus level[1]
- Replacement for three ZME modules
- Replacement for SYT9 module
- Unit protection via integrated fuse
- Easy installation via rail mounting

Typical Applications

- Glass bending furnaces
- Flat glass manufacturing lines
- Pipe trace heating
- Furnace manufacturing
- Machine construction

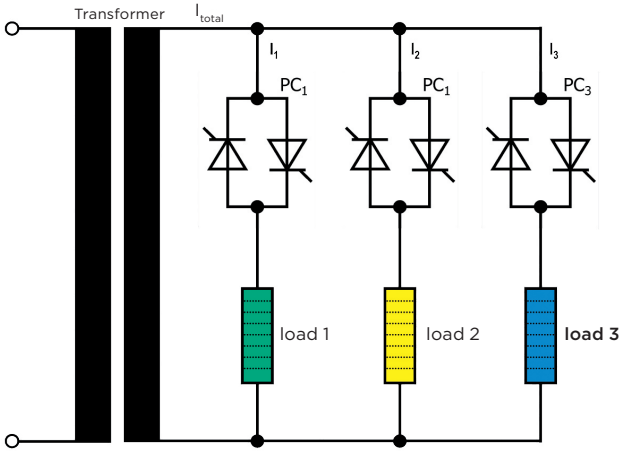


EASY CONTROL AND INTEGRATION

Change parameters either via rotary switches and potentiometers or via PC software menu. Link the Thyro-Power Manager to process and automization technology via the integrated RS-232 interface and optional bus module.[1]

For static mains load optimization, select either automatic or manual operating mode as required. Easily monitor current values or mains load peaks via three integrated transformer inputs that can be parameterized.

[1] *Pending*



Example: Heating zone 1: 50% output
Heating zone 2: 50% output
Heating zone 3: 50% output

Figure 1. Diagram for three heating zones

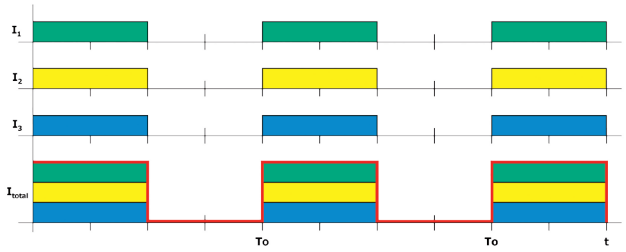


Figure 2. Without mains load optimization (worst case)

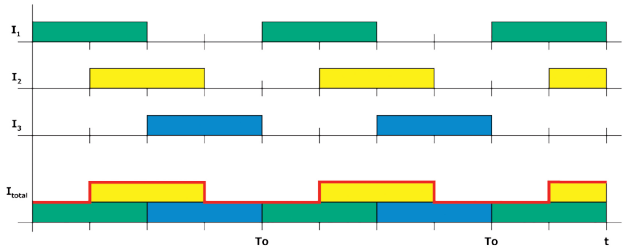


Figure 3. Static mains load optimization with the Thyro-Power Manager

SPECIAL FEATURES/OPERATING MODES

Automatic operating mode: the clock cycle duration T_0 (1 sec) is automatically spread out evenly between the various power controllers/groups connected, thereby avoiding uneven power distribution and utilizing the entire time domain.

Manual operating mode: the clock cycle duration T_0 (1 sec) can be spread out manually between the various power controllers/groups connected. This is useful when some power controllers/groups work with high set points or long turn-on time T_s and other power controllers/groups work with low set points or short turn-on time T_s.

ADDITIONAL FEATURES

- Current value/mains load peak monitoring
- Output/energy level measurement
- Mains voltage and temperature measurement
- Integrated operating hours meter

CERTIFICATES

- Quality standard DIN ISO 9001
- CE conform
- RoHS conform 5/6

EXAMPLE CALCULATION FOR TEN POWER CONTROLLERS CONNECTED IN PARALLEL

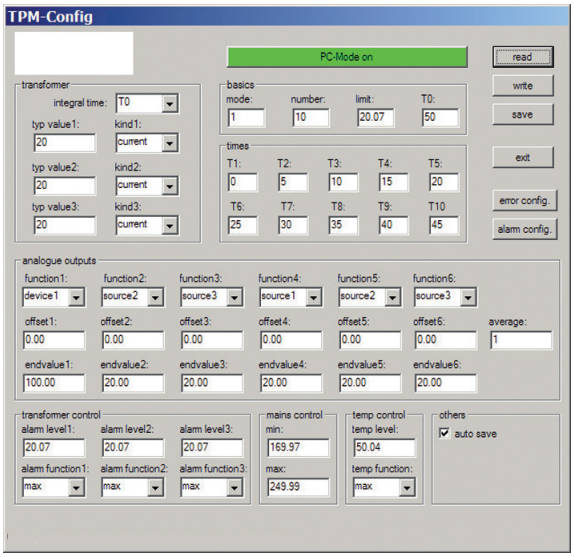


Figure 4. Thyro-Power Manager (TPM) configuration screen

Clock period duration T_0 = 50 cycle times/turn-on time T_S = 3 cycle times
Power controller current I_0 = 1 A

$$I_{RMS} = I_0 * \sqrt{\frac{T_S}{T_0}} \qquad I_{RMS} = 10 * 1A * \sqrt{\frac{3}{50}} = 2.45\,A$$

At best, the mains load optimization of the TPM reduces total current to the single current of one power controller (T_S is extended accordingly)

$$I_{RMS\,(TPM)} = I_0 * \sqrt{\frac{10 * T_S}{T_0}} \qquad I_{RMS\,(TPM)} = 1A * \sqrt{\frac{30}{50}} = 0.77\,A$$

Whereby the RMS current value without mains load optimization is higher by a factor of:

$$f = \frac{I_{RMS}}{I_{RMS\,(TPM)}} = \underline{3.18}$$ than with the use of TPM.

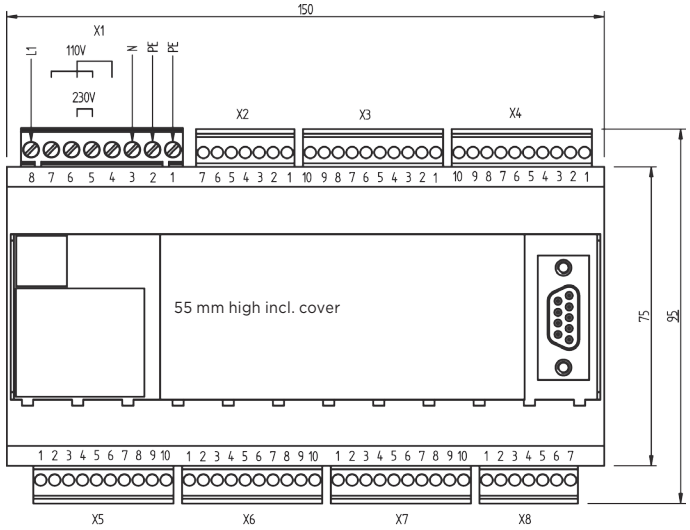
SPECIFICATIONS

Technical Data		
Operating Mode	Static mains load optimization (10 circuits)	
Special Functions	Automatic mains load optimization Manual mains load optimization	
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 DC 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
Measurement 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	EN 60146-1-1		
Conditions of Operation	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	EN 50 178 Tab. 7 (EN 60 721)	
Pollution Level	2	EN 50 178 Tab. 2	
Air Pressure	900 mbar	Corresponds to max 1000 m above	
Protection Type	IP00	EN 69 529	
Protection Rating	III	EN 50 178 Kap. 3	
Shock Resistance	EN 50 178 Kap. 6.2.1		
Inspections	According to EN 60 146-1-1 4		
EMC Emittet Interferences	EN 61000-6-4		
Radio Interference Suppression	Class A	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		



Drawing dimensions are in mm.

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

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