DISAI
Automatic Systems

Advanced Energy

THYRO-FAMILY
SCR POWER CONTROLLERS

THYRO-S | THYRO-A | THYRO-A+ | THYRO-PX

Leading Technology, Proven Solutions

Digital SCR Power Controllers

No other SCR power controller series offers the flexibility and performance of Advanced Energy's Thyro-Family line. Our solutions meet your toughest design challenges. Thyro-Family ensures high product quality and reproducibility in applications ranging from simple to complex. With a 50-year history, their precision and reliability is proven for any industrial manufacturing process requiring exacting material melting, heating, drying, or forming.

Benefits

Connectivity and performance options enable optimization and savings for:

- Process control
- Process documentation
- Installation and commissioning
- System availability

Applications

- Automotive
- Carbon fibers
- Chemical and oil
- Coatings
- Crystal growing
- Deposition equipment
- Glass manufacturing
- Industrial furnaces
- IR drying
- Machine building
- Metals
- Packaging
- Painting machines and printers
- R&D
- Semiconductor
- Solar and renewable energy
- Vibratory/material handling

Certificates and compliance

- Quality standard to DIN EN ISO 9001
- Certification to UL 508[1]
- SCCR, according with UL 508A (100 kA short circuit test)[1]
- CSA Canadian National Standard[1]
- CE
- Secure separation between power and control section
- Integrated semiconductor fuses

[1]Individual product types are excluded

THYRO-S AT A GLANCE

Voltage Range

230, 400, or 500 V

Current Range

8 to 350 A

Operating Resolution

±3.0%

Display Screen

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Certification And Compliance

- UL 508A (100 kA SCCR)
- CE
- ISO 9001 quality standards
- CSA Canadian National Standard C22.2 No. 14-95

Thyro-S®

Thyristor Switch, 8 to 350 A

The high-effiency, connection-ready Thyro-S thyristor switch delivers accurate, reliable, switch-free performance. It can be connected to bus systems, used as a standalone unit, or used in combination with all established two-point process controllers, PLCs, or computer systems. With simple mounting, minimal space requirements, quick commissioning, and safe operation, Thyro-S thyristor switches are easily integrated into a wide range of applications.

PRODUCT HIGHLIGHTS

- For ohmic or transformer loads
- Current, voltage, or power switching
- 230, 400, or 500 V
- 8 to 350 A
- Integrated semiconductor fuse
- Secure isolation between control and power sections
- 1-, 2- and 3-phase versions of Thyro-S units
- DIN rail mounting (up to 60 A; for 1- and 2-phase devices)
- LED status and level indication
- Micro-USB interface

TYPICAL APPLICATIONS

- Automotive (paint drying equipment)
- Chemical (pipe trace heaters, pre-heating equipment)
- Furnace construction (industrial, diffusion, drying ovens)
- Glass processing (drying coatings)
- Machine building (extruders, plastic presses)
- Packaging (shrink tunnels)
- Printing machines (IR drying)

Summary Specifications			
Thyro-S Model	**1S**	**2S**	**3S**
Rated Voltage	230 V, 400 V, 500 V	400 V, 500 V	400 V, 500 V
Rated Current	Up to 350 A		
V_{Mains}	Up to 0.43 x V_{nom}		
Frequency	47 to 63 Hz		
Communication	Standard system interface		
	Optional bus connection		
	Thyro-Tool Pro PC software via Micro-USB interface		
Control Input with 24 VDC	> 3 V = ON		
Connection (Bus Options via BasicBusModule)	Ethernet/IP®, Profibus® DPV1, Modbus® TCP/IP, DeviceNet™, Profinet®		

Additional Options		
Thyro-S	**H 3**	**H RLP3**
Features	Resistive and transformer loads	Load circuit monitoring
	Micro-USB interface	Current measurement
		External 24 VDC supply
		Alarm relay
		Analog output
		Micro-USB interface

THYRO-A AT A GLANCE

Voltage Range

230 to 600 V

Current Range

8 to 1500 A

Operating Resolution

±3.0%

Display Screen

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Load Monitoring

Yes, for H RL3 and H RLP3 types

Certification And Compliance

- UL 508A (100 kA SCCR)
- CE
- ISO 9001 quality standards
- CSA Canadian National Standard C22.2 No. 14-95

Thyro-A®

SCR Power Controller, 8 to 1500 A

With highly flexible interfacing for the load and power supply side, Thyro-A® modules precisely and reliably control power in an expanded range of applications.

PRODUCT HIGHLIGHTS

- Wear-free operations and precise, reliable performance
- DIN rail mounting (up to 60 A; for 1- and 2-phase devices)
- Integrated protection against contact
- Rated voltages up to 600 V; currents up to 1500 A
- 1-, 2- and 3-phase versions (2-phase version for 3-phase load without deploying the neutral conductor)
- Integrated semiconductor fuses
- LED status and level indication
- Micro-USB interface

TYPICAL APPLICATIONS

- Automotive (paint drying equipment)
- Chemical (pipe trace heaters, pre-heating equipment)
- Furnace construction (industrial, diffusion, drying ovens)
- Glass processing (drying coatings)
- Machine building (extruders, plastic presses)
- Packaging (shrink tunnels)
- Printing machines (IR drying)
- Vibration technology

Summary Specifications			
Thyro-A Model	**1A**	**2A**	**3A**
Rated Voltage	230 V, 400 V, 500 V, 600 V	400 V, 500 V, 600 V	400 V, 500 V, 600 V
Rated Current	Up to 1500 A		
V_{Mains}	Up to 0.43 x V_{nom}		
Frequency	47 to 63 Hz		
Phase	For 1-phase load between 2-phase or phase against neutral	For 3-phase economic circuits (delta connection or star connection without neutral)	For 3-phase load (star connection without neutral, star connection with neutral, delta connection, or open delta)
Communication	Standard system interface		
	Optional bus connection		
	Thyro-Tool Pro PC software via Micro-USB interface		
Set Point Settings	Analog input: 0(4)-20 mA, 0(1)-5 V, 0(2)-10 V		
	Digital via BasicBusModule or Thyro-Tool Pro PC software		
Operating Modes	TAKT: Full frequency package control	TAKT: Full frequency package control	TAKT: Full frequency package control
	VAR: Phase-angle	SWITCH: Switch control	VAR: Phase-angle
	QTM: Half-wave frequency package control		SWITCH: Switch control
	VT: VAR and TAKT combined modes on request)		
	SWITCH: Switch control		
Connection (Bus Options via BasicBusModule)	Ethernet/IP®, Profibus® DPV1, Modbus® TCP/IP, DeviceNet™, Profinet®, Thyro-Tool Pro PC software, BasicBusModule with dASM for mains load optimization of multiple Thyro-A units		

Additional Options			
Thyro-A	**H 3**	**H RL3**	**H RLP3**
Features	Control types V, V^2	Control types V, V^2, I, I^2	Control types V, V^2, I, I^2, P
	Resistive and transformer loads	Load circuit monitoring	Load circuit monitoring
	Micro-USB interface	Resistive and transformer loads	Resistive and transformer loads
		External 24 VDC/VAC supply	External 24 VDC/VAC supply
		Alarm relay	Alarm relay
		R_{warm}/R_{cold} up to ≤ 6	R_{warm}/R_{cold} up to ≤ 6
		Analog output 10 V/20 mA	Analog output 10 V/20 mA
		Voltage and current indication at analog output	Voltage, current, and power indication at analog output
		Micro-USB interface	Micro-USB interface

THYRO-A+ AT A GLANCE

Voltage Range

230 to 500 V
Others available on request

Current Range

16 to 280 A
Others available on request

Operating Resolution

±1.5%

Display Screen

Color Display

Load Monitoring

Yes

Certification And Compliance

- **UL 508A (100 kA SCCR) (in preparation)**
- **CE**
- **ISO 9001 quality standards**
- **CSA Canadian National Standard C22.2 No. 14-95 (in preparation)**

Thyro-A+

SCR Power Controller, 16 to 280 A

With new performance features, an optional color display, and increased measurement accuracy, the Thyro-A+ SCR power controller precisely and reliably controls power.

PRODUCT HIGHLIGHTS

- Optional display to easily visualize, commission or set parameters (no potentiometer adjustments are needed)
- Comprehensive operating and control modes to save system costs for resistive and transformer loads
- Increase performance control accuracy to maximize end process repeatability
- Easy fieldbus integration with optional BasicBusModule and available Anybus® interfaces
- Micro-USB interface
- Integrated Modbus RTU fieldbus interface
- Performance range with rated voltages up to 500 V and rated currents up to 280 A

TYPICAL APPLICATIONS

- Automotive (paint drying equipment)
- Chemical (pipe trace heaters, pre-heating equipment)
- Crystal growing (sapphire, silicon)
- Furnace construction (industrial, diffusion, drying ovens)
- Glass (plate glass equipment, feeders, finishing equipment)
- Machine building (extruders, plastic presses)
- Packaging (shrink tunnels)
- Printing machines (IR drying)
- SEMI applications

Summary Specifications			
Thyro-A+ Model	**1A**	**2A**	**3A**
Rated Voltage / Rated Current	230 to 500 V / Up to 280 A		
Mains Load Optimization	External via BasicBusModule with dASM		
Frequency	47 to 63 Hz		
Phase	For 1-phase load between 2-phase or phase against neutral	For 3-phase economic circuits (delta connection or star connection without neutral)	For 3-phase load (star connection without neutral, star connection with neutral, delta connection, or open delta)
Communication	Standard system interface		
	Internal Modbus RTU interface		
	Internal Micro-USB for connection to Thyro-Tool Pro software		
	Additional optional fieldbus connection via BasicBusModule		
Set Point Settings	2 analog inputs, switchable: 0(4) to 20 mA, 0(1) to 5 V, 0(2) to 10 V		
	Digital via bus system or Thyro-Tool Pro PC software		
Operating Modes	TAKT: Full frequency package control	TAKT: Full frequency package control	TAKT: Full frequency package control
	VAR: Phase-angle	SWITCH (Soft-Start, Soft-Down)	VAR: Phase-angle
	SWITCH (Soft-Start, Soft-Down)		SWITCH (Soft-Start, Soft-Down)
Connection	(Bus Options via BasicBusModule) Ethernet/IP®, Profibus® DPV1, Modbus® TCP/IP, DeviceNet™, Profinet®		

Thyro-A+ Model	**H RL4**	**H RLP4**
Features	Control types V, V^2, I, I^2	Control types V, V^2, I, I^2, P
	Load circuit monitoring	Load circuit monitoring
	External 24 VDC supply	External 24 V supply
	R_{warm}/R_{cold} up to 6	R_{warm}/R_{cold} up to 6
	Voltage and current indication at analog output	Voltage, current, and power indication at analog output
	Graphic user interface via display and relay output (exchanger, status signals adjustable)	Graphic user interface via display and relay output (exchanger, status signals adjustable)
	Analog output 0/2 to 10 V, 0/4 to 20 mA	Analog output 0/2 to 10 V, 0/4 to 20 mA

Thyro-A+ Display Unit

- Intuitive operation
- Integrated process data recording

Thyro -A+ DIsplay Unit	
Features	Display can be switched to bar chart or actual values (numeric)
	Optional SD card to load or save data and parameter settings
	EasyStart and TeachIn features for easy commissioning of Thyro-A+
	Integrated process data recording with long-term data recorder of process parameters as well as status messages

THYRO-PX AT A GLANCE

Voltage Range

230 to 690 V

Current Range

16 to 5000 A

Operating Resolution

±0.5%

Display Screen

2.8 in (71.1 mm) LED touch screen

Load Monitoring

Yes

Certification And Compliance

- UL 508A (100 kA SCCR)
- CE
- ISO 9001 quality standards
- CSA Canadian National Standard C22.2 No. 14-95

Thyro-PX®

SCR Power Controller, 16 to 5000 A

The Thyro-PX® series are modular, easy-to-use premier performance SCR power controllers for heating elements, resistive loads and transformer loads, in heating, melting, drying, and forming applications.

PRODUCT HIGHLIGHTS

- Comprehensive operating and control modes to minimize harmonic distortion and utility costs
- High-efficiency, wear-free design with integrated soft starting for usage with downstream transformers
- Premier performance control accuracy to maximize end-process repeatability
- Multi-zone capability that independently controls multiple single-phase loads from a single controller
- Wide communication protocol flexibility for simple integration into Rockwell™ PAC via certified AOP
- Wide performance range with rated currents up to 5000 A and rated voltages up to 690 V
- Intuitive performance and status feedback via a modular, integrated touch screen display or PC tool

TYPICAL APPLICATIONS

- Transformer loads, resistive loads, and heating elements in electric furnaces used for glass, metals, and ceramics manufacture
- Heat tracing for piping and process elements in chemical, petro-chemical, and oil processing
- Extruder and plastic press heating, IR drying, and automotive applications
- Rectifier applications (DC) for H_2 electrolysis (on request)

Summary Specifications			
Thyro-PX Model	**1PX**	**2PX**	**3PX**
Rated Voltage	230 to 500 V and 690 V within 184 to 759 V		
Rated Current	Up to 5000 A		
Mains Load Optimization	Optional dASM interface card: Mains load optimization functionality includes fully digital dASM operation in TAKT operating mode.		
Frequency	47 to 63 Hz		
Phase	1, 2, or 3		
Control Types	V, V^2, I, I^2, P		
Set Point Settings	Up to 3 analog input: 0(4) to 20 mA, 0(1) to 5 V, 0(2) to 10 V		
	Digital via Anybus modules, Thyro-Touch display, or Thyro-Tool Pro PC software (Micro-USB)		
	Optional I/O cards		
Bus Options (via Anybus modules)	Ethernet/IP®, Profibus® DPV1, Modbus® TCP/IP, DeviceNet™, Profinet®, EtherCAT®		

Additional Options	
Thyro-PX	
Options	Digital I/O cards: Easily add inputs and outputs or connections for your specific requirements
	Thyro-Tool Pro PC software: Commissioning, visualization, and diagnosis of all SCR power controller units
	dASM: Digital and dynamic working mains load optimation synchronization of multiple power controllers; suitable for Thyro-PX series
	Thyro-Touch kit for cabinet door or panel installation

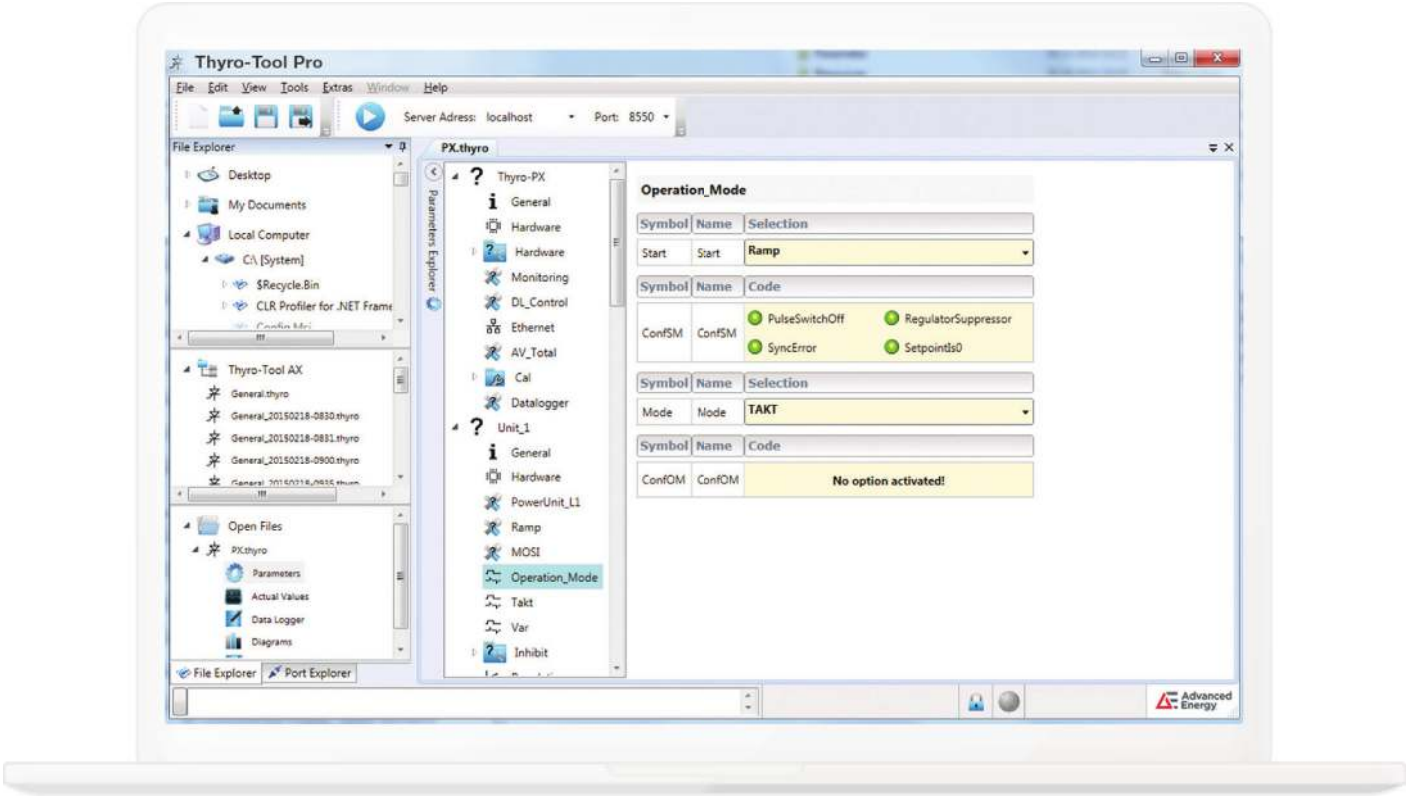
Thyro-Touch Display Unit

- Integrated process data recording
- Easy operation via touch display

Thyro -Touch Unit	
Features	Switchable display to bar chart, line chart, actual values, or data logger
	Integrated SD card to load or save data
	Process data recorder of up to 6 parameters as well as status messages
	Analysis via Thyro-Touch tool on PC
	EasyStart feature for easy commissioning of Thyro-PX with basic settings
	Languages: German, English (additional options on request)

Software Options

Software	
Thyro-Tool Pro	
Tailored PC software for commissioning, visualization and diagnosis of Thyro-S, Thyro-A, Thyro-A+ and Thyro-PX SCR power controllers	Easy connection via Micro-USB interface
	Individual analysis for each connected SCR power controller (system driven via IP address)
	Actual value
	Set points
	Line charts
	Parameter analysis
	Simultaneous presentation of process data of several power controllers



Communications Options

Communications	
Bus Protocols	
Available for: BasicBusModule and Anybus modules	Ethernet/IP®
	Profibus® DPV1
	DeviceNet™
	PROFINET®
	Modbus® TCP
	EtherCAT
BasicBusModule	
Key features for Thyro-S, Thyro-A, and Thyro-A+ bus modules	Optional connection of up to 8 power controllers
	Use of Anybus® interface of different available common fieldbus communications
	Full parameter access to power controller with Thyro-Tool Pro software via integrated Micro-USB interface
	Available for optional mains load optimization with dASM
	Function control via LEDs
	External power supply: 24 VDC, 200 mA per module
Anybus Modules	
Key features for Thyro-PX Anybus modules	Use of Anybus® interface of different available common fieldbus communications
	Full parameter access to power controller with Thyro-Tool Pro software via integrated Micro-USB interface

BasicBusModule

Anybus Module

dASM for BasicBusModule

Available for: Thyro-A and Thyro-A+

The digital dASM feature for BasicBusModule offers high-efficiency mains load optimization, including significant reduction of flicker effects and lower operating and investment costs.

Key Features

- Easy installation and commissioning of dASM feature
- Mains load optimization in groups of up to 32 units (eight units per single module, in any order)
- Very short response times for set point and load changes
- Power monitoring (load level)
- Easy wiring, parameter-setting, and commissioning
- Retrofittable to existing systems

ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. We design and manufacture highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

PRECISION | POWER | PERFORMANCE

DISAI Automatic Systems

Advanced Energy

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