

# **THYRO-A**

## DIGITAL SCR POWER CONTROLLER 8 TO 1500 A



Striking the perfect balance between price and performance, the Thyro-A° is an outstanding industry proven SCR power controller that is ideal for a wide range of general heating applications.

#### **PRODUCT HIGHLIGHTS**

- Flexible application design with wide range of operating voltages and current ranges
- Low THD (total harmonic distortion) for improved power utilization
- Full digital communication protocol suite
- Compact footprint for space savings and simplified installation
- Precise regulation of power, including load management for optimal control and energy consumption
- Customizable faults, alarms, status, limits, set points for easy integration to existing control systems
- Optimized load control with five control types and three operating modes for process efficiency
- Integrated voltage and current measurement reduces costs and eliminates need for external components or monitoring hardware

#### 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, petrochemical and oil processing
- Extruder and plastic press heating, IR drying and automotive applications

#### **AT A GLANCE**

#### **Phase Type**

1, 2, and 3-phase power controller

#### **Accuracy**

±3% Voltage ±1.5% Current

#### **AC Input Line Voltage Rating**

230V to 500V [-57% to +10%] or 230V to 500V [-15% to +10%] depending on configuration

#### **Type Current Range**

8 to 1500 A

#### **Control Modes**

Zero Cross Firing (TAKT)
Phase-Angle Firing (VAR)
Quick TAKT Mode (QTM)
Combination TAKT/VAR Mode
(VT)

#### **Communications**

Ethernet/IP®, Profibus®,
Profinet®, Modbus RTU®,
Modbus TCP/IP®, DeviceNET™

## **PRODUCT SPECIFICATIONS**

Thyro-A Model					
Thyro-A 1A	Thyro-A 2A	Thyro-A 3A			
1-phase version, for 1-phase load between 2-phases or for 1-phase connected to the neutral phase	2-phase version for 3-phase load in cost saving 3-phase circuit	3-phase version, for 3-phase load			
Operating Modes: TAKT, VAR, QTM, VT	Operating Mode: TAKT	Operating Modes: TAKT, VAR			
Thyro-A Series					
Control Accuracy	±3% Voltage and ±1.5% Current				
Load Types	Ohmic loads and transformer loads (Limit of 3 x	I <sub>nom</sub> )			
	Transformer loads				
Mains Load Optimization	Internal mains load optimization for the operating	g modes QTM and TAKT			
	Interface for external mains load optimization available	ailable, e.g. Thyro-Power Manager, dASM bus			
Operating Modes	TAKT (full wave switch): Full frequency package	control			
	VAR (phase-angle firing): Firing of each sinus hal	lf-wave			
	QTM (half wave frequency package control): Quick operating mode for ohmic load without a transformer				
	VT: Combination of operating modes VAR and TA	AKT (on request)			
ModelF					
Functional Features	Forced ventilation				
ModelH 3					
Set Points	2 set point inputs, secured (SELV, PELV) from the	emains			
	Input of analog set point, signal intervals: 0(4)-20 mA, 0(1)-5 V, 0(2)-10 V				
	Control input for switch operation mode - dual preset point is provided by the process computer or				
Control Types	V <sub>eff</sub> / V <sup>2</sup> <sub>eff</sub>				
ModelH RL3 (additional to H 3 features)					
Control Types	$V_{\rm eff}/V_{\rm eff}^2/I_{\rm eff}/I_{\rm eff}^2$				
Load Monitoring	Via an adjustable response threshold				
Limitations	Current limitation I <sub>eff</sub> / Î VAR current peak limitati	ion to Î = 3 x I <sub>nom</sub>			
Relay Output	Exchanger, max. contact load 250 V, 6 A, 180 W,	1500 VA			
Analog Output	Signal level 0(2)-10 V / 0(4)-20 mA, max. compliance voltage 10 V. Can also be used as adjustment aid				
External Supply	24 V DC/AC, connected upon demand				
Load Types	Ohmic load employed at R <sub>warm</sub> /R <sub>cold</sub> ratio of up to 6 (only deployed for H RL3 and H RLP3)				
Operational Display	Via LEDs and relay output (exchanger, indication	s adjustable)			
ModelH RLP3 (additional to H RL3 feature					
Modeln KLP3 (additional to n KL3 leature					



## **ELECTRICAL SPECIFICATIONS**

Rated Voltages	H 3	H RL3 and H RLP3
	230 V -15% +10%	230 V-15% +10%, 230 V -57% combined with 24 V input
	400 V -15% +10%	400 V-15% +10%, 400 V -57% combined with 24 V input
	500 V -15% +10%	500 V -15% +10%, 500 V -57% combined with 24 V input
Frequency	For all types from 47 to 63 Hz	

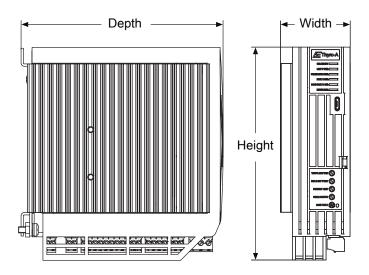
Environmental Specifications				
Ambient Temperature	Up to 35°C (95°F) by external fan cooling (for F types, with integrated fan) with rated current			
	Up to 45°C (113°F) by passive convection cooling with rated current			
At higher temperatures, operation is permissible with reduced current limits.				
	Max 40°C (104°F) for UL applications			
Storage Temperature	-25 to +55°C (-13 to 131°F)			
Humidity	5% to 95% relative humidity			
Site Altitude	Up to 2000 m (6562') above sea level			

Regulatory Approvals				
Certifications	CE conformity			
	UL Certified, UL 508A (100 kA short circuit test), accredited 8 to 350 A			
	Canadian National Standard C22.2 No. 14			
	ISO 9001 Quality Standards			



## **MECHANICAL SPECIFICATIONS**

## Thyro-A 1A H 3/H RL3/H RLP3

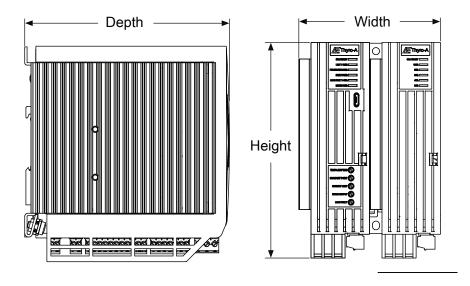


Design may change when using a fan and/or rated current > 350  $\,\mathrm{A}$ 

Dimensions								
Type Current (A)	Width		Height	Height Depth		Weight		
	mm	in	mm	in	mm	in	kg	lb
8	45	1.8	136	5.4	129	5.1	0.7	1.5
16	45	1.8	136	5.4	129	5.1	0.7	1.5
30	45	1.8	136	5.4	129	5.1	0.7	1.5
45	52	2.0	203	8.0	184	7.2	1.7	3.8
60	52	2.0	203	8.0	184	7.2	1.7	3.8
100	75	3.0	203	8.0	193	7.6	1.9	4.2
130	125	4.9	320	12.6	241	9.5	4	8.8
170	125	4.9	320	12.6	241	9.5	4	8.8
280	125	4.9	370	14.6	241	9.5	5	11.0
350	125	4.9	400	15.8	261	10.3	8.4	18.5
495	112	4.4	414	16.3	345	13.6	15	33.1
650	112	4.4	414	16.3	345	13.6	15	33.1
1000	239	9.4	729	28.7	516	20.3	35	77.2
1400	239	9.4	729	28.7	516	20.3	35	77.2
1500	239	9.4	729	28.7	516	20.3	35	77.2

## MECHANICAL SPECIFICATIONS (CONTINUED)

## Thyro-A 2A H 3/H RL3/H RLP3



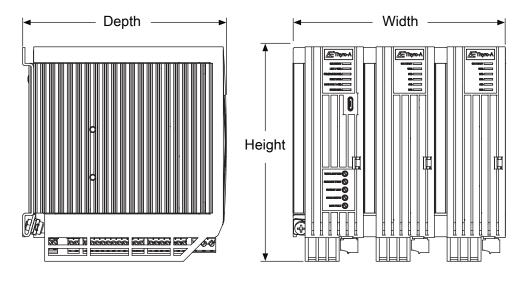
Design may change when using a fan and/or rated current > 350 A

Dimensions								
Type Current (A)	Width		Height		Depth		Weight	
	mm	in	mm	in	mm	in	kg	lb
8	89	3.5	136	5.4	129	5.1	1.4	3.1
16	89	3.5	136	5.4	129	5.1	1.4	3.1
30	89	3.5	136	5.4	129	5.1	1.4	3.1
45	104	4.1	203	8.0	184	7.2	3.4	7.5
60	104	4.1	203	8.0	184	7.2	3.4	7.5
100	150	5.9	203	8.0	193	7.6	3.8	8.4
130	250	9.8	320	12.6	241	9.5	8.0	17.6
170	250	9.8	320	12.6	241	9.5	8.0	17.6
280	250	9.8	393	15.5	241	9.5	11.0	24.3
350	250	9.8	430	16.9	261	10.3	16.7	36.9
495	194	7.6	380	15.0	345	13.6	22	48.5
650	194	7.6	380	15.0	345	13.6	22	48.5
1000	417	16.4	685	27.0	516	20.3	54	119.0
1400	417	16.4	685	27.0	516	20.3	54	119.0
1500	417	16.4	685	27.0	516	20.3	54	119.0



## MECHANICAL SPECIFICATIONS (CONTINUED)

## Thyro-A 3A H 3/H RL3/H RLP3



Design may change when using a fan and/or rated current > 350 A

Dimensions								
Type Current (A)	Width		Height	Height Depth		Depth		
	mm	in	mm	in	mm	in	kg	lb
8	135	5.3	136	5.4	129	5.1	2.1	4.6
16	135	5.3	136	5.4	129	5.1	2.1	4.6
30	135	5.3	136	5.4	129	5.1	2.1	4.6
45	156	6.1	203	8.0	184	7.2	5.1	11.2
60	156	6.1	203	8.0	184	7.2	5.1	11.2
100	225	8.9	203	8.0	193	7.6	5.7	12.5
130	375	14.8	320	12.6	241	9.5	12.0	26.5
170	375	14.8	320	12.6	241	9.5	12.0	26.5
280	375	14.8	393	15.5	241	9.5	15.0	33.1
350	375	14.8	430	16.9	261	10.3	25.5	56.2
495	276	10.9	380	15.0	345	13.6	30.0	66.1
650	276	10.9	380	15.0	345	13.6	30.0	66.1
1000	583	23.0	685	27.0	516	20.3	74.0	163.1
1400	583	23.0	685	27.0	516	20.3	74.0	163.1
1500	583	23.0	685	27.0	516	20.3	74.0	163.1

## **INTERFACE**

Status LEDs	Multiple color status LEDs for parameters:
	ON / READY
	LIMIT / 100%
	PULSE LOCK / 80%
	FAULT / 60%
	LOAD FAULT / 40%
	MAINS / 20%
Control Interface	Micro-USB connector for Thyro-Tool Pro PC software connection
Analog and Digital Interface	One digital input
Card	One analog output
	One analog input
10-pin DIP Switch	Multiple device configuration DIP switches for parameters:
	Operating Mode
	Control Mode
	Setpoint Input
	Analog Output
Front Panel Potentiometers	Five externally accessible multi-turn potentiometers to configure parameters:
	First Half-wave Phase Angle (Transformer applications)
	Scale Setpoint
	Current Limit
	Scale Output
	Load Monitoring

## **STANDARD OPTIONS**

Options	
USB to Micro-USB cable	For connection to Thyro Tool Pro software visualization and commissioning
Thyro-Tool Pro PC software	PC software for commissioning, visualization, configuration, and trending
dASM Interface Module	Digital and dynamic working mains load optimization
Communications bus module	Optional bus module for Profibus® DPV1, Modbus® RTU, DeviceNet™, Profinet®, Modbus® TCP, Ethernet/IP®



## **ORDERING INFORMATION**

Model	Description
Thyro-A	Modular Digital SCR Power Controller with current range to 1500 Amps, ±3% Voltage or Current Accuracy

Code	Phase Type
1A	Single phase power controller for single phase operation
2A	Two phase power controller for three phase economic circuits (economic three phase circuit)
3A	Three phase power controller for three phase operation

Code	AC Input Line Voltage
230	Type Voltage 230 V: 'H3' type: 230 V -57% to +10% [99 V to 253 V] OR 'H RL3' / 'H RLP3' type: 230 V -15% to +10% <sup>1</sup>
400	Type Voltage 400 V : 'H3' type: 400 V -57% to +10% [172 V to 440 V] OR 'H RL3' / 'H RLP3' type: 400 V -15% to +10% <sup>1</sup>
500	Type Voltage 500 V: 'H3' type: 500 V -57% to +10% [215 V to 550 V] OR 'H RL3' / 'H RLP3' type: 500 V -15% to +10% 1

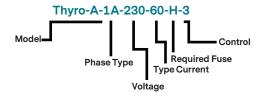
Code	Type Current, TC	Apparent Power [kVA]			
Available only with Phase Type Option 1A and 230 V Type Voltage		1A	2A	3A	
8	TC = 8 A	3.2			
16	TC = 16 A	3.7			
30	TC = 30 A	6.9			
45	TC = 45 A	10			
60	TC = 60 A	14			
100	TC = 100 A	23			
130	TC = 130 A	30			
170	TC = 170 A	39			
280	TC = 280 A	64			
350	TC = 350 A	80			
Available with all Phase Type Options and 400 V Type Voltage		1A	2A	3A	
8	TC = 8 A	3.2	6	6	
16	TC = 16 A	6.4	11	11	
30	TC = 30 A	12	21	21	
45	TC = 45 A	18	31	31	
60	TC = 60 A	24	41	41	
100	TC = 100 A	40	69	69	
130	TC = 130 A	52	90	90	
170	TC = 170 A	68	118	118	
280	TC = 280 A	112	194	194	
350	TC = 350 A	140	242	242	
495	TC = 495 A	198	353	353	
650	TC = 650 A	260	450	450	
1000	TC = 1000 A	400	693	693	
1500	TC = 1500 A	600	1039	1039	

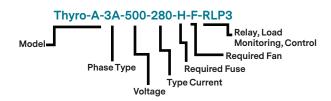


## **ORDERING INFORMATION (CONTINUED)**

Code	Type Current, TC	Apparent Pov	Apparent Power [kVA]				
Available with all Phase Type Options and 500 V Type Voltage		1A	2A	3A			
16	TC = 16 A	8	14	14			
30	TC = 30 A	15	26	26			
45	TC = 45 A	22	39	39			
60	TC = 60 A	30	52	52			
100	TC = 100 A	50	86	86			
130	TC = 130 A	65	112	112			
170	TC = 170 A	85	147	147			
230	TC = 230 A	115	199	199			
280	TC = 280 A	140	242	242			
350	TC = 350 A	175	303	303			
495	TC = 495 A	247	429	429			
650	TC = 650 A	325	563	563			
1000	TC = 1000 A	500	866	866			
1400	TC = 1400 A	700	1212	1212			
Code	Integrated Semiconductor Fuse						
Н	Integrated semiconductor fuse [REQUIRED]						
Code	Forced Air Cooling Via Integrated Fan <sup>1</sup>						
F	230 VAC forced air cooling via integrated fan [REQUIRED]						
Code	Relay, Load Monitoring, Control						
3	Standard V, V <sup>2</sup> control modes						
RL3	24V DC/AC power supply, signaling relay, load monitoring, analog output, current limit, V, V², I, I² control modes						
RLP3	24V DC/AC power supply, signaling relay, load monitoring, analog output, current limit, V, V², I, I², P control modes						
Code	Additional Options <sup>2</sup>						
C09	PCB conformal coating						
C10	115 VAC forced air cooling via integrated fan¹						

<sup>1</sup> Not available with TC options < 230 A





<sup>2</sup> Choose as many as required.

 $<sup>\</sup>textbf{3} \ \ \text{Note that AC Input Line Voltage range for 'H RL3' and 'H RLP3' types is -57\% to +10\% when an auxiliary 24 V}$ 

#### **ABOUT ADVANCED ENERGY**

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

AE's power solutions enable customer innovation in complex semiconductor and industrial thin film plasma manufacturing processes, demanding high and low voltage applications, and temperature-critical thermal processes.

With deep applications know-how and responsive service and support across the globe, AE builds collaborative partnerships to meet rapid technological developments, propel growth for its customers and power the future of technology.

PRECISION | POWER | PERFORMANCE



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