

# Control your Power

## Thyro-A

Thyristor Power Controller (SCR) up to 1,500 A

### Safe, fast, economical and communication enabled

The new Thyro A series, SCR power controllers feature an advanced digital design, which offers a wider selection of communications options, configurable parameters and precise power controls.

### Heating - Melting - Forming

Highly flexible for interfacing the load and power supply sides, the range of applications for Thyro-A has expanded significantly. For standard processes, adjustments can be made on the unit, which facilitate handling and speed up commissioning.

Due to its ability to interface at the automation level, Thyro-A's stand-alone functionality may be expanded to accommodate high-level parameter measurements, status and setpoint processing via SPC or advanced microprocessor applications.

Thyro-A Power Controllers are ideally suited for numerous applications within the scope of process engineering technology. These include:

- Ovens (industrial, diffusion, drying)
- Glass processing (plate glass equipment, feeders, finishing equipment, fiber glass)
- Plant equipment (extruders, plastic presses)
- Chemical industry (pipe trace heaters, pre-heating equipment),
- Automotive industry (paint drying equipment),
- Printing machines (IR drying),
- Packaging industry (shrink tunnels).



### Key Features

In addition to durable operation and unmatched performance, the Thyro-A series offers the following features:

- Condensed and modular design
- Rated voltages up to 600 V
- Rated currents up to 1,500 A
- Single, dual, and three-phase versions (Dual-phase version for three-phase load without deploying the neutral conductor in a cost-saving three-phase circuit)
- Integrated semi-conductor fuses
- LED status indicators

### Automation Level

- Series-design system interface for connection to an optimal bus module (Profibus DPV1, Modbus RTU, DeviceNet, CANopen,...) for the processing of set points and actual values, as well as for status reports
- Interface option for connection to PC software Thyro-Tool Family
- Safe isolation of control and power units

### Analog Control Input

- Adjustable analog input. With six user-definable ranges between 0-10 V or 0-20 mA
- Wide voltage range for dual-state digital input. OFF = 0 - 3.0 V; ON = 3.0 - 24 V

### Load Side

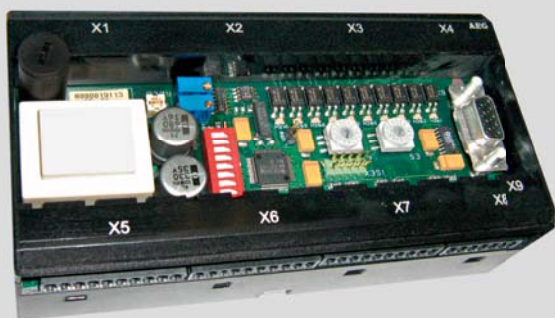
- Short-circuit current protection and high SCR reverse voltage ratings
- Designed for resistive, inductive or compound load types
- Fit for transformer-type load due to an integrated soft-start function, phase-angle firing of the first half-wave and channel separation
- Optimized load control due to the implementation of up to 5 control types and 3 operating modes

### Power Supply Side

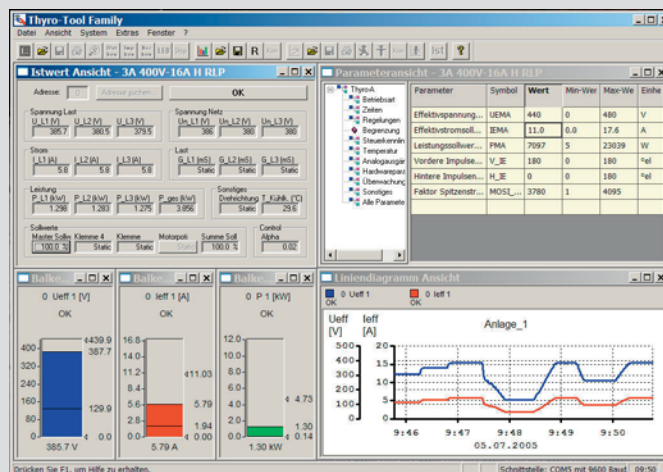
- Wide operational range. Line voltages as low as 0.43 x nominal line voltage ( $V_{nom}$ ).
- Single or separate sources for load and internal 24 V control power supplies.
- Frequency range 47-63 Hz
- Built in multi-unit load optimization for TAKT (zero cross) and QTM (Quick TAKT Mode)
- Optional Thyro Power Manager Module for network-based multi-unit load optimization

### Other Features

- Quality standards in accordance with ISO 9001
- UL 508 Approved
- SCCR-certified in accordance to UL 508 A (100 kA short circuit test 16 - 1,500 A)
- Canadian National Standard
- CE Conformity
- GOST
- RoHS Conformity 5/6



Thyro-Power Manager



Thyro-Tool Family

# Specification – type series and technical data (excerpt)

<b>Operating modes</b>	TAKT (zero cross)	full wave switching	
	VAR, phase angle	phase angle firing of positive and negative cycles	
	QTM, half-wave switching	quick operating mode for ohmic load without a transformer	
<b>Thyro-A</b>	1A...	Single phase version, for single phase load between dual phases, or for a single phase connected to neutral Operating modes: TAKT, VAR, QTM	
	2A...	Dual phase version, for three phase load implemented within a cost-saving three phase circuit configuration Operating mode: TAKT	
	3A...	Three phase version, for three phase load Operating modes: TAKT, VAR	
<b>Rated voltage ...H1</b>	...230... 230 V - Operating Range (-57% +10%) or (99 V - 253 V)		
	...400... 400 V - Operating Range (-57% +10%) or (172 V - 440 V)		
	...500... 500 V - Operating Range (-57% +10%) or (215 V - 550 V)		
	...600... 600 V - Operating Range (-57% +10%) or (258 V - 660 V)		
<b>Rated voltage ...H RL1 and H RLP1</b>	...230... 230 V - Operating Range (-15% +10%) or (195 V - 253 V)	[99 V - 253 V - requires external 24 V supply.]	
	...400... 400 V - Operating Range (-15% +10%) or (340 V - 440 V)	[172 V - 440 V - requires external 24 V supply.]	
	...500... 500 V - Operating Range (-15% +10%) or (425 V - 550 V)	[215 V - 550 V - requires external 24 V supply.]	
	...600... 600 V - Operating Range (-15% +10%) or (510 V - 660 V)	[258 V - 660 V - requires external 24 V supply.]	
	Network frequency 47 Hz to 63 Hz max. frequency variation, +/-5% per half wave.		
<b>Rated current</b>	...-xxx...	16 A, 30 A, 45 A, 60 A, 100 A, 130 A, 170 A, 280 A, 350 A, 495 A, 650 A, 1,000 A, 1,400 A, 1,500 A	
	Load type	Ohmic load	
	Network load	Optimization via internal network load optimization for the operating modes QTM and TAKT Interface for external network load optimization available, e.g. Thyro-Power Manager	
<b>Maximum ambient temperature</b>	35°C (95°F) - fan cooled - [280 A, 350 A, 495 A, 650 A, 1,000 A, 1,500 A]		
	45°C (113°F) - no fan - [16 A, 30 A, 45 A, 60 A, 100 A, 130 A, 170 A]		
	40°C (101°F) - UL applications		
	Derate rated load currents at -2% / °C for increased ambient temperature		
<b>Functional features</b>	Setpoint inputs	2 setpoint inputs, separated safely (SELV, PELV) from the mains	
	Analog input set points - (6) ranges.	0(4) - 20 mA / 0(1) - 5 V / 0(2) - 10 V	
		Control input for switch operation mode – dual-point control is possible ( $V_{on} = 3-24$ V)	
		The digital setpoint is provided by the process computer or bus system	
	...H 1	Control types	$V_{eff}$ , $V_{eff}^2$
	...H RL1	Functional features	Includes ...H1 features, plus the following:
		Control types	$V_{eff}$ , $V_{eff}^2$ , $I_{eff}$ , $I_{eff}^2$
		Load monitoring	via an adjustable response threshold
		Current limit	Current limitation $I_{eff}$ in VAR mode, current peak limitation to $\hat{I} = 3 \times I_{nom}$
		Relay output	max. contact load 250 V, 6 A, 180 W, 1500 VA
		Analog output	Signal level 0(2)-10 Volt / 0(4)-20 mA, maximum compliance voltage 10 V can be used for adjusting
		External supply	24 V DC/AC, connected only upon demand
		Load types	for ohmic load employed at a $R_{warm}/R_{cold}$ ratio of up to 6 (only deployed for H RL1 and H RLP1) Current limit to $\hat{I} = 3 \times I_{nom}$ (for H RL1 and H RLP1 in VAR mode)
		Status outputs	via LEDs and relay outputs (exchanger, indications adjustable)
	...H RLP1	Functional features	includes ...all H RL1 features, plus the following:
	Control types	$V_{eff}$ , $V_{eff}^2$ , $I_{eff}$ , $I_{eff}^2$ , P	
<b>System interface</b>	Optional bus module for Profibus DPV1, Modbus RTU, DeviceNet, CANopen, ProfiNet...		
	Projected: ModBus TCP/IP, Ethernet IP.		
	For interfacing the PC software of the Thyro-Tool Family via a PC adaptor		
<b>Structured part number example:</b>	Thyro-A 2A 400-170 HRLP1		
	2A = dual phase version for three phase load implemented within a cost-saving three phase circuit configuration, 400 = 400 V rated voltage		
	170 = 170 A rated current, H = semi-conductor fuse, R = failure indicator relay		
	L = load monitoring + analog output, P = Power control + display, 1 = actual series		

\* Refer to Thyro-A Operating Instruction manuals for detailed specifications.

# Specification - type series and technical data (excerpt)

## THYRO-A 1A H1<sup>®</sup>, HRL1, HRLP1



### Single-phase power controller

...H1	...HRL1	...HRLP1	Current (A)	Unit rating (kVA)				Power loss (W)	Dimensions (in)			Weight (lb) approx.
				230 V	400 V	500 V	600 V		W	H	D	
			16	3.7	6.4	8	-	30	1.77	5.16	5	1.54
			30	6.9	12	15	-	47	1.77	5.16	5	1.54
			45	10	18	22.5	-	48	2.05	7.48	7.17	3.75
			60	14	24	30	-	80	2.05	7.48	7.17	3.75
			100	23	40	50	-	105	2.95	7.48	7.48	4.19
			130	30	52	65	-	150	4.92	12.6	9.49	8.82
			170	39	68	85	-	210	4.92	12.6	9.49	8.82
..F.			280	64	112	140	-	330	4.92	14.57	9.49	11.02
..F.			350	80	140	175	-	390	4.92	15.75	10.28	18.52
..F.			495	-	198	274	297	556	4.41	16.3	13.58	33.07
..F.			650	-	260	325	390	638	4.41	16.3	13.58	33.07
..F.			1,000	-	400	500	600	1,277	9.41	28.7	20.32	77.06
..F.			1,400	-	-	750	900	1,700	9.41	28.7	20.32	77.06
..F.			1,500	-	600	-	-	1,703	9.41	28.7	20.32	77.06

## THYRO-A 2A H1<sup>®</sup>, HRL1, HRLP1



### Dual-phase power controller for three-phase loads implemented with a cost-saving three-phase circuit configuration

...H1	...HRL1	...HRLP1	Current (A)	Unit rating (kVA)				Power loss (W)	Dimensions (in)			Weight (lb) approx.
				230 V	400 V	500 V	600 V		W	H	D	
			16	-	11	14	-	60	3.54	5.16	5	3.09
			30	-	21	26	-	94	3.54	5.16	5	3.09
			45	-	31	39	-	96	4.09	7.48	7.17	7.49
			60	-	42	52	-	160	4.09	7.48	7.17	7.49
			100	-	69	87	-	210	5.91	7.48	7.48	8.38
			130	-	90	112	-	300	9.84	12.6	9.33	17.64
			170	-	118	147	-	420	9.84	12.6	9.33	17.64
..F.			280	-	194	242	-	660	9.84	14.57	9.33	24.25
..F.			350	-	242	303	-	780	9.84	16.93	10.28	36.82
..F.			495	-	343	429	514	1,190	7.64	14.96	13.39	48.5
..F.			650	-	450	563	675	1,465	7.64	14.96	13.39	48.5
..F.			1,000	-	693	866	1,039	2,785	16.42	26.97	20.32	119.05
..F.			1,400	-	-	1,299	1,599	3,300	16.42	26.97	20.32	119.05
..F.			1,500	-	1,039	-	-	3,510	16.42	26.97	20.32	119.05

## THYRO-A 3A H1<sup>®</sup>, HRL1, HRLP1



### Three-phase power controller

...H1	...HRL1	...HRLP1	Current (A)	Unit rating (kVA)				Power loss (W)	Dimensions (in)			Weight (lb) approx.
				230 V	400 V	500 V	600 V		W	H	D	
			16	-	11	14	-	90	5.32	5.18	5	4.63
			30	-	21	26	-	141	5.32	5.18	5	4.63
			45	-	31	39	-	144	6.14	7.48	7.17	11.24
			60	-	42	52	-	240	6.14	7.48	7.17	11.24
			100	-	69	87	-	315	8.86	7.48	7.48	12.57
			130	-	90	112	-	450	14.76	12.6	9.49	26.01
			170	-	118	147	-	630	14.76	12.6	9.49	45.01
..F.			280	-	194	242	-	990	14.76	15.63	9.49	33.07
..F.			350	-	242	303	-	1,170	14.76	16.93	10.28	56.22
..F.			495	-	343	429	514	1,860	10.87	16.02	13.39	66.14
..F.			650	-	450	563	675	2,265	10.87	16.02	13.39	66.14
..F.			1,000	-	693	866	1,039	4,310	22.95	26.97	20.32	163.14
..F.			1,400	-	-	1,299	1,559	5,000	22.95	26.97	20.32	163.14
..F.			1,500	-	1,039	-	-	5,325	22.95	26.97	20.32	163.14

(\* ) ...H1 types available up to 350 A

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