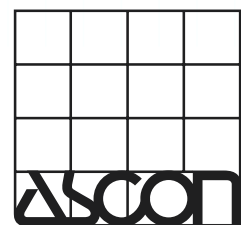


# Microprocessor Based Thyristor Power Controllers Lines TH-S, TH-A, TH-P

The TH-P, TH-A and TH-S lines of power controller by Ascon meet the most common requirements, offering a complete set of single phase, three-phase economy and three-phase power controllers with a wide range of nominal voltages and currents. The different operation modes, such as the phase angle operation, wave train and MOSI for Super KANTAL, allow use with any type of load. Internal diagnostic and load monitoring functions ensure safe operation.

A red square containing a white circle with the letter 'E' inside.

ISO 9001 Certified



## TH-S line: For heating processes with resistive or infrared loads

ThyroS can be used as an "enhanced" static switch with zero crossing capabilities. TH-S has no mechanical moving parts, resulting in maintenance free operation. Zero crossing operation offers the benefit of being free of line noise harmonics.

Fine power control adjustments can be obtained by operating with free DC components half waves operation (1:2, 1:3, 1:5 mode).

A wide range of power and current ratings are available.

### Features

#### Compact:

The TH-S is compact in size, and can be easily mounted on a DIN rail inside an electrical cabinet.

#### Complete:

TH-S is supplied with all the necessary thyristor protections (RC, semiconductor fuse, ...), the unit is self-contained and no options are required.

#### Safe:

Control is obtained by emitting the calculated number of full waves, no DC components are generated. Oversized thyristors assure high resistance to current and temperature overloads.

#### Easy and fast installation:

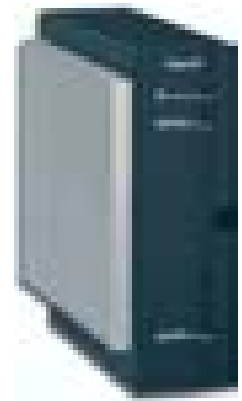
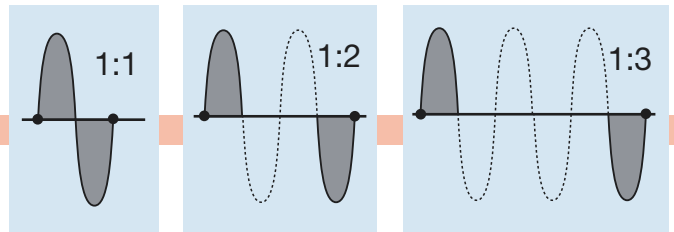
Only power and a control signal are necessary; no external load protection fuses are needed.

#### Diagnostic functions

The ThyroS can be equipped to detect total or partial load failure. The ThyroS can also be equipped with fuse failure indication.

#### Open communications:

Each ThyroS can be equipped with ModBus RTU, Profibus DP slave and CANopen.



## TH-A line: For the control of high or low temperature coefficient heating elements with up to 240 kW power

ThyroA series is a complete line of single phase, three phase economy and true three phase power controllers. Load control can be made on voltage, current or power. Units include self and load circuit monitoring functions. Two different operating modes are available: Full wave (TAKT) and Half wave (QTM) switching.

### Features

#### Universal:

The ThyroA line are models suitable for all electrical heating applications ranging up to 240 kW.

#### Versatile:

Models A/...-...H1 is the best solution for low temperature coefficient heating elements with direct connection and for transformer connected loads. Models A/...-... HRL1, A/...-... HRLP, with load monitoring and power control, are the best choice for high temperature coefficient (6:1) heating elements which require load monitoring.

#### Universal:

The start-up procedures, the control and monitoring functions, the configuration and the parameters setting are common for all the single phase and three phase models.

#### Reliable:

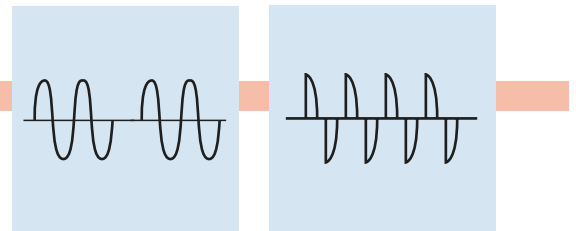
All models up to 170A are oversized to allow natural ventilation cooling (no cooling fans required).

#### Diagnostic functions:

LED status indicators signal if the power controller is powered, operating properly, or if there are device errors or load problems.

#### Open communications:

Each ThyroA can be equipped with ModBus RTU, Profibus DP, or CANopen communications.



# TH-P line: For control of high or low temperature coefficient heating elements with up to 2.8 MW power

ThyroP is a complete line of single phase, three phase economy and three phase power controllers. Load control can be made on voltage, current or power (accuracy: 0.5%). Total or partial load breaks are detected for both low or high (20:1) temperature coefficient heating elements. Also provided is the MOSI operating mode which is dedicated to "Super KANTHAL" elements. Multiple load applications can use synchronized power controllers to minimize power load peaks when working in the full wave mode. TH-P configuration can be carried out with simple PC configuration software (TYROTOOL-P) or via the integrated data display (ATHPLBA) options.

## Features

**High performance:**  
ThyroP is controlled by a 32bit, 40 MHz, RISC microprocessor. All the operating modes, control and monitoring functions are integrated in the unit. Flexibility allows the Tyro-P line to be adapted to fit the user's requirements for any electrical heating application.

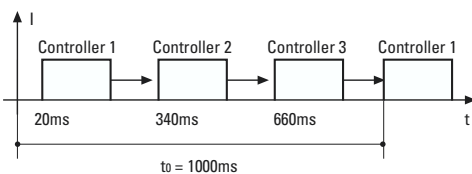
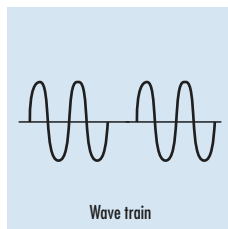
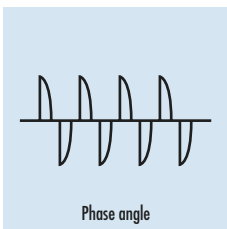
**Enhanced:**  
The ThyroP can be integrated in complex systems by using one the available internal serial ports. Integrated communications allow the user to configure, access all operating parameters, and view diagnostic information.

**Safe:**  
All the ThyroP models can be equipped with a removable control and display module (ATHPLBA); this module allows the user to verify the configuration, the parameters and to obtain rapid diagnostic information.



- RS232
- PROFIBUS DP
- Modbus RTU
- optical fiber communications

## Operating Modes:

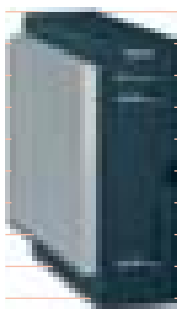


**MOSI:**  
This operating mode has been specifically developed to control high temperature coefficient loads with Rh/Rc values up to 20, such as Super KANTHAL type heating elements. ThyroP models 1P and 3P start the heating sequence in phase angle pre-heating mode, and then automatically switching to wave train heating once the pre-heating phase is complete.

**ASM™**  
This special function allows synchronisation of multiple ThyroPs (in wave train operating modes) in order to optimise the load on the power line. By using this function, it is possible to avoid excess current peaks and allow the application to be sized for lower load rating which result in significant cost reductions.

# TH-S Line

## Thyristor switches



CHARACTERISTICS	TH1S/...-... H1	TH1S/...-... HRL1
<b>Setpoint input:</b>		
DC	•	•
Relay	•	•
<b>Semiconductor fuse</b>	•	•
<b>Diagnostic:</b>		
Fuse failure	•	•
Load monitoring		•
Internal fault	•	•
<b>Fault indication:</b>		
LED	•	•
Relay		•

SPECIFICATIONS		
Voltage ratings (V)	230, 400, 500 (-57*...+10%)	
Current ratings (A)	16, 30, 45, 60, 100, 130, 170, 280	
Additional 24V Power supply for the internal circuits	—	Yes
Operating modes	Half wave pulses dc free (1:1, 1:2, 1:3, 1:5)	
Relay or voltage input	Input voltage: 0...24 V ("On" : > 3 V)	
Load monitoring	—	Undercurrent
ThyroS self monitoring	Yes	
Fault indication	LED	LED and relay
Load	Resistance or infrared (transformers not allowed)	
Type designation (load type)	Single phase, three phase with 2 controlled phases, three phase with neutral, 3 x single phase	
Ambient temperature	Natural ventilation: -10...+45°C; forced cooling: -10...+35°C (...-280 HF...) (up to 55°C with a 2%/°C current derating)	
Dimensions W x H x L (mm)		
16A, 30A	45 x 121 x 127	
45A, 60A	52 x 190 x 182	
100A	75 x 190 x 190	
130A, 170A	125 x 320 x 237	
280A	125 x 370 x 237	
CE and UL Approval	Yes	
Serial communications (option)	Modbus RTU - PROFIBUS DP Slave - CANopen	

\* On HRL1 the value -57% is valid only if the unit is powered by an external 24Vdc power supply otherwise consider -15...+10%.

### Ordering codes

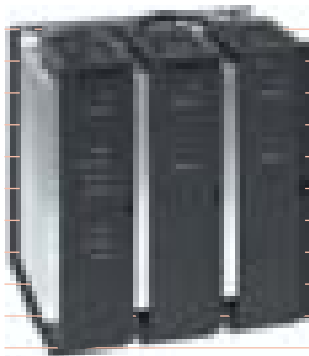
Nominal voltage (V)  
 Nominal current (A)  
 Type H1, HRL1 (HF1, HFRL1 for 280A)

TH1S / [ ] - [ ] [ ]

Example:  
 TH1S/400-280 HFRL1

# TH-A Line

## Power Controllers



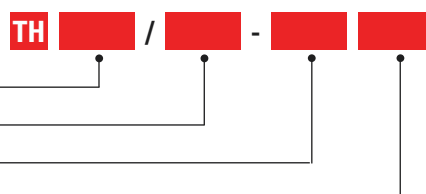
CHARACTERISTICS	TH1(2)(3)A/...-... H1	TH1(2)A/...-... HRL1	TH1(2)(3)A/...-... HRLP
Full wave switch mode	•	•	•
Phase angle mode (not for TH2A)	•	•	•
Control mode	V, V <sup>2</sup>	V, V <sup>2</sup> , I, I <sup>2</sup>	V, V <sup>2</sup> , I, I <sup>2</sup> , P
Load monitoring		•	•
Current limiting		•	•

SPECIFICATIONS								
Voltage ratings (V)	230 (for TH2A and TH3A use 400), 400, 500 (-57*...+10%)							
Current (A)	16, 30, 45, 60, 100, 130, 170, 280							
Additional 24V Power supply	—				Yes			
Operating modes	Full wave switch operation (TAKT) Half wave switch mode (QTM, only 1A) Phase angle operation (VAR, not 2A)							
Set point input	0/4...20 mA (Ri 250Ω), 0/1...5 V (Ri 44 kΩ), 0/2...10 V (Ri 88 kΩ), potentiometer (5...10kΩ)							
Setpoint scaling	Yes							
Analog output	—				Yes			
Limiting	V		V, I		V, I, P			
Load monitoring	—				Undercurrent			
Internal diagnostic	Yes							
Fault indications	LED				LED + Relay			
Load	Resistance and Transformer Load				Resistance & Transformer load, as well as load with high Rh/Rc			
Type designation (load type)	Single phase operation (1A) Symmetrical loads in three phase economy circuits operation (2A) and three phase operation (3A)							
Ambient temperature	45°C natural ventilation (up to 170A), 35°C forced cooling (280A) -2%/°C current derating up to 55°C							
Dimensions W x H x L (mm)	1A	2A	3A	1A	2A	1A	2A	3A
16A, 30A	45x121x127	90x121x127	135x131.6x127	45x121x127	90x121x127	45x121x127	90x121x127	135x131.6x127
30A, 40A, 50A	—	—	—	—	—	—	—	—
45A, 60A	52x190x182	104x190x182	156x190x182	52x190x182	104x190x182	52x190x182	104x190x182	156x190x182
100A	75x190x190	150x190x190	225x190x190	75x190x190	150x190x190	75x190x190	150x190x190	225x190x190
80A, 110A	—	—	—	—	—	—	—	—
130A, 170A	125x320x237	250x320x237	375x320x241	125x320x237	250x320x237	125x320x237	250x320x237	375x320x241
280A	125x370x237	250x393x237	375x397x241	125x370x237	250x393x237	125x370x237	250x393x237	375x397x241
Approvals	CE, UL, with consideration to Canadian National Standard							
Serial communications	ModBus RTU, Profibus DP, CANopen (optional)							

\* On HRL1 and HRLP the value -57% is valid only if the unit is powered by an external 24Vdc power supply otherwise consider -15...+10%.

### Ordering codes

Thyro A model  
Nominal voltage (V)  
Nominal current (A)  
Type H1, HRL1 (HF1, HFRL1 for 280A)



### Examples:

TH3A/300-60 H1  
TH2A/400-170 HRL1  
TH1A/500-280 HFRL1

# TH-P Line

## high performance Power Controllers



### CHARACTERISTICS

- Control Type: V,V2,I,I2,P (0.5% accuracy), or no control
- Actual value outputs for Current, Voltage, Power and Set Point
- Load circuit monitoring for total or partial fault
- 32 bit RISK processor. Graphical LCD control Display (LBA)
- First world patented load optimization procedure (ASM)
- Operating modes: Full wave switch operation (TAKT), Phase angle operation (VAR), Soft start – soft down (SSSD)
- Sub operating mode for large Rh/Rc heating elements (MOSI). Eg: Molybdenum Disilicide resistance
- Integrated semiconductor fast fuses
- PROFIBUS DP Slave

SPECIFICATIONS	TH1P	TH2P	TH3P
Voltage ratings (V)	230...400, 500, 690 ±10%		
Current ratings (A)	230...400V, 500 V: 37, 75, 110, 130, 170, 280, 495, 650, 1000, 1500, (3P: 1850, 2600) (2P: 2000, 2750), (1P: 2100, 2900) 690 V: 80, 200, 300, 780, 1400 (3P: 1700, 2200), (2P: 1850, 2400), (1P: 2000, 2600)		
Operating modes	Full wave switch (TAKT), Phase angle (VAR), Soft start-soft down (SSSD), MOSI	Full wave switch (TAKT), Soft start-soft down (SSSD)	Full wave switch (TAKT), Phase angle (VAR), Soft start-soft down (SSSD), MOSI
Setpoint input	0/4...20 mA (Ri ≅ 60 W,) max. 24mA; 0/1...5 V (Ri ≅ 30 kW), 0/2...10 V (Ri ≅ 10 kW) max. 12V, potentiometer (1...10kW)		
Control Type	V,V2,I,I2,P, no control		
Control accuracy	±0.5% ±1 digit		
Limiting	V (voltage), I (current), P (power)		
Analog output	3 analog outputs for V, I, P, SP actual values		
Load monitoring	Yes		
Self Diagnostic	Yes		
Indications	6 LED; 3 Relays, LBA		
Load	Resistance, Transformer load and loads with large Rh/Rc (up to 20:1)	Resistance, Transformer load and loads with large Rh/Rc	Resistance, Transformer load and loads with large Rh/Rc (up to 20:1)
Type designation (load type)	Single phase operation	Symmetrical loads in three phase economy circuit operation	Three phase operation
Ambient temperature (°C)	45°C natural ventilation (up to 170A), 35°C forced cooling (280A). Reduced type current -2%/°C up to 55°C		
Dimensions W x H x L (mm)			
37A, 75A, 110A	150 x 320 x 229	225 x 320 x 229	300 x 320 x 229
130A, 170A	200 x 320 x 229	325 x 320 x 229	450 x 320 x 229
280A,	200 x 370 x 229	325 x 397 x 229	450 x 397 x 229
495A, 650A	174 x 414 x 340	261 x 414 x 340	348 x 430 x 340
1000A, 1500A	240 x 685 x 505	410 x 685 x 505	575 x 685 x 505
1850A	—	—	526 x 1094 x 445
2000A	—	526 x 837 x 445	—
2100A	521 x 577 x 445	—	—
2600A	—	—	603 x 1094 x 470
2750A	—	603 x 837 x 470	—
2900A	603 x 577 x 470	—	—
Communications	RS232 for LBA or thyrotool, fiber optic, Profibus DP, Modbus RTU		
Approvals	CE, UL (UL approval for models up to 650 A)		

### Ordering codes

Thyro P model

Nominal voltage (V)

Nominal current (A)

Programming keyboard: 0 (absent), A (local), B (with remote installation kit)

TH [ ] / [ ] - [ ] / [ ] [ ] [ ]

### Example:

TH3P/400-110/A0A

ASM: 0 (absent)  
A (present)

Profibus: 0 (absent)  
P (present)

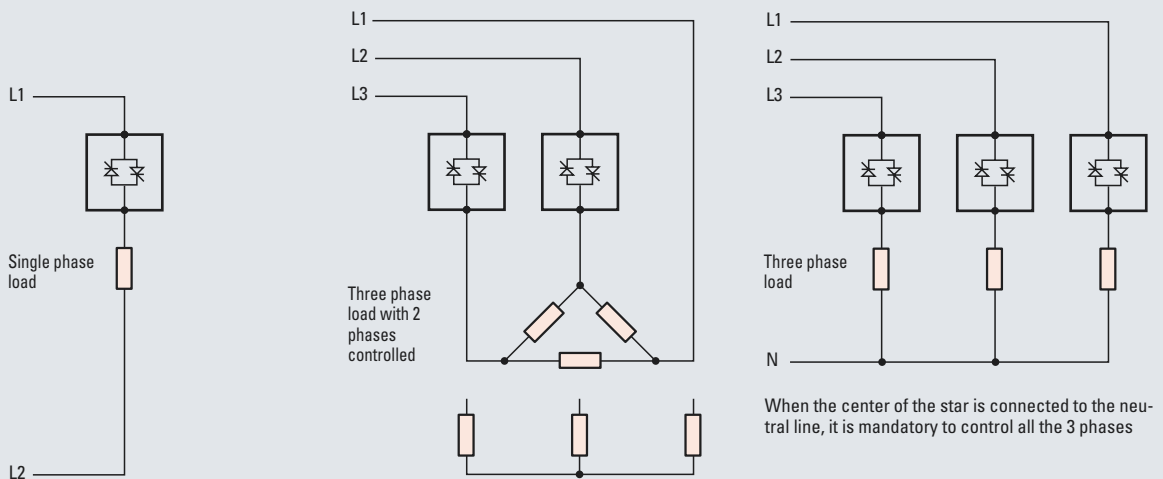
## Technical data

### General characteristics common to all the Power Controllers

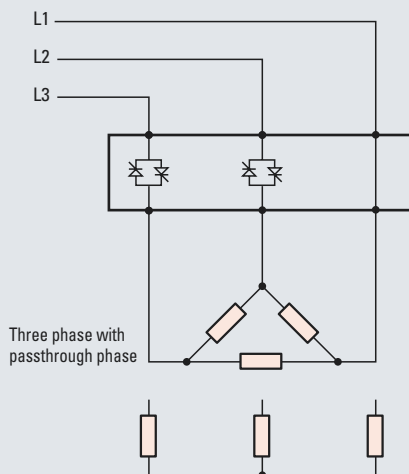
Frequency (Hz)	50/60 ±3
Storage temperature (°C)	-25...+70
Humidity class	"B" as per EN 50 178 Table 7
Environmental conditions	non conductive atmosphere, free from corrosive and explosive materials or gases
Operating altitude (m)	up to 1000 m above sea level at nominal load
Test voltage	as per EN 50 178 Table 18
Device operating conditions	EN 60 146-1-1; K. 2.5
Contamination class	2 as per EN 50 178 Table 2
Surge voltage category	III as per EN 50 178 Table 3
Safe isolation	EN 50 178 Chapter 3
Application position	CISPR 6
Installation	vertical
Connection	bottom and front of unit
Approvals	CE, UL (file E 135074)

### Connection examples

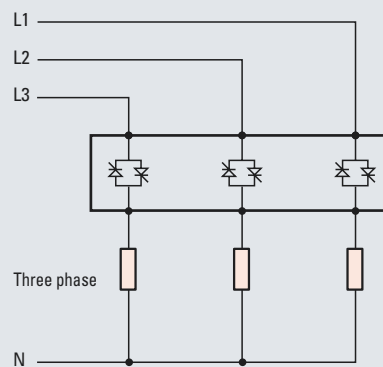
#### Single phase power unit



#### Two phase unit



#### Three phase unit





S E R I E S

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