

# THYRO-PX SERIES

DIGITAL THYRISTOR SCR POWER CONTROLLER  
UP TO 2900 AMPS



## AT A GLANCE

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 2900 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

### Phase Type

1, 2, and 3-phase power controller

### Accuracy

±0.5% voltage or current  
±1% power

### AC Input Line Voltage Rating

230 to 500 V [-20 to +10%]  
690 V [-20 to +10%]

### Type Current Range

16 to 2900 A

### Control Modes

Zero cross firing (TAKT)  
Phase-angle firing (VAR)  
Voltage sequence control (VSC)  
Soft start, soft down

### Communications

Ethernet/IP®, EtherCAT®  
PROFIBUS®, PROFINET®  
Modbus RTU®, Modbus TCP/IP®  
DeviceNET™

## PRODUCT SPECIFICATIONS

| THYRO-PX Model               |                                                                                                                                   |                              |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Thyro-PX 1PX                 | Thyro-PX 2PX                                                                                                                      | Thyro-PX 3PX                 |
| One-phase power controller   | Two-phase power controller for three-phase economic circuit                                                                       | Three-phase power controller |
| Full wave switch (TAKT)      | Full wave switch (TAKT)                                                                                                           | Full wave switch (TAKT)      |
| Phase-angle firing (VAR)     | —                                                                                                                                 | Phase-angle firing (VAR)     |
| THYRO-PX Series              |                                                                                                                                   |                              |
| Control Accuracy             | ±0.5% voltage or current, ±1% power                                                                                               |                              |
| Load Types                   | Resistive loads, transformer loads, and loads with large $R_{warm}/R_{cold}$ up to factor 20 (MOSI starting mode)                 |                              |
| Operating Modes              | TAKT: full frequency package control                                                                                              |                              |
|                              | VAR: phase-angle firing                                                                                                           |                              |
|                              | VSC_VAR: voltage sequence control with phase-angle firing                                                                         |                              |
| Control Types                | U-voltage, $U^2$ -voltage, I-current, $I^2$ -current, P-power, without regulation                                                 |                              |
| Set Point Input              | Up to 3 analog inputs (freely configurable), control start/finish can be set as desired between 0 (4) to 20 mA; 0 (1) to 10 (2)V. |                              |
| Actual Value Outputs         | 3 measuring values for optional display of U, I, and P; can be set as desired between 0 to 20 mA; 0 to 10 V                       |                              |
| Load Circuit/Self-Monitoring | Provided                                                                                                                          |                              |
| Operation/Fault Indicators   | Via 3 fault signaling relays and status/diagnostic LEDs, freely configurable                                                      |                              |
| Fuse                         | Integrated semiconductor fuse                                                                                                     |                              |

## ELECTRICAL SPECIFICATIONS

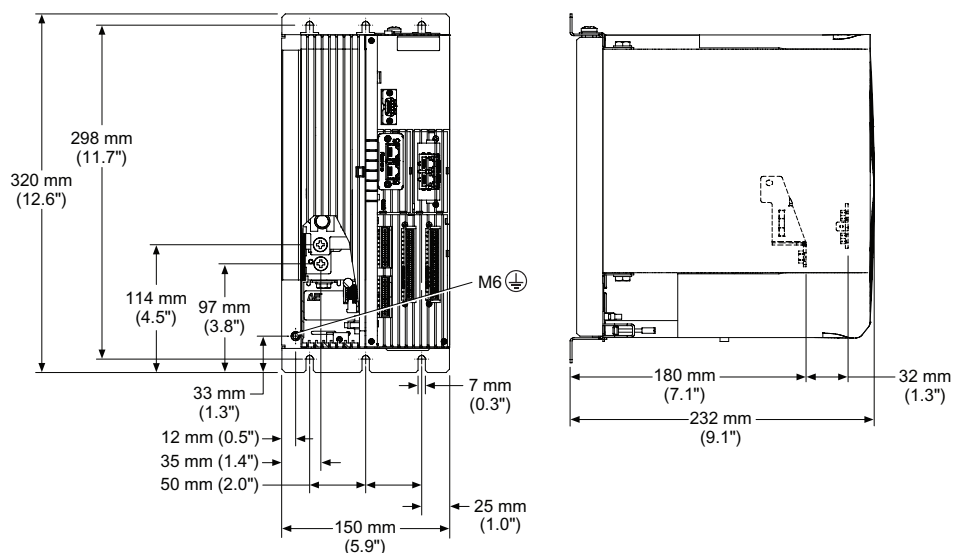
|                            |                                                    |
|----------------------------|----------------------------------------------------|
| Rated Connection Voltage   | 500 V type: 230 V -20% up to 500 V +10%            |
|                            | 690 V type: 500 V -20% up to 690 V +10%            |
| Frequency                  | All types, 45 to 65 Hz                             |
| Control Voltage            | AC min 90 to max 265 V; alternative DC 24 V (±10%) |
| Ventilator (HF Types Only) | 230 V, 50 to 60 Hz; optional 115 VAC, 50 to 60 Hz  |

| Environmental       |                                                                                                  |
|---------------------|--------------------------------------------------------------------------------------------------|
| Ambient Temperature | Up to 35°C (95°F) by external fan cooling (for HF 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 Class      | DIN EN 50178 Tab. 7                                                                              |
| Site Altitude       | Up to 1000 m (3281 ft) above sea level at nominal load; above 1000 m (3281 ft), on request       |

| Regulatory     |                                                          |
|----------------|----------------------------------------------------------|
| Certifications | CE marked for EU LV Directive 2014/35/EU and 2004/108/EC |
|                | UL Certified, UL 508A (100 kVA short circuit test)       |

## MECHANICAL SPECIFICATIONS

### Thyro-PX 1PX, 500 V Type Voltage

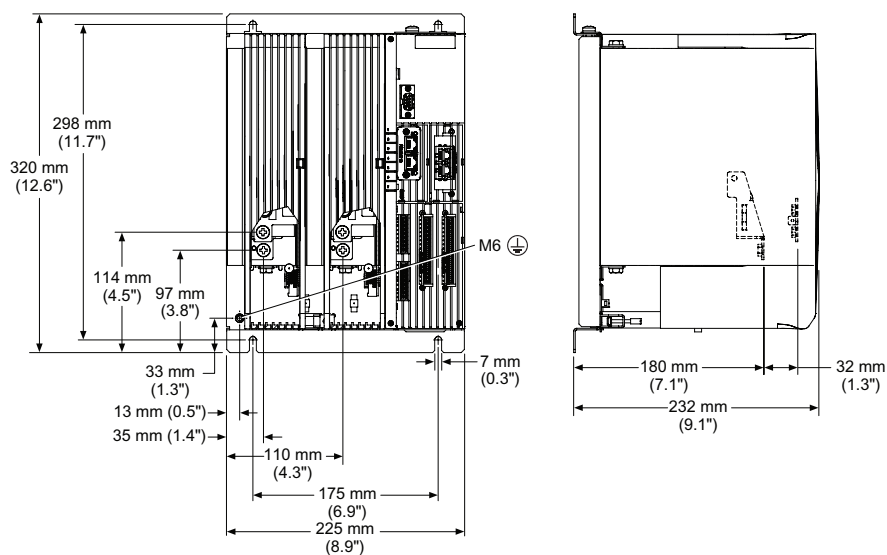


Design may change when using a fan and/or rated current > 350 A

| Dimensions       |       |      |        |      |       |      |        |       |
|------------------|-------|------|--------|------|-------|------|--------|-------|
| Type Current (A) | Width |      | Height |      | Depth |      | Weight |       |
|                  | mm    | in   | mm     | in   | mm    | in   | kg     | lb    |
| 16               | 150   | 5.9  | 320    | 12.6 | 232   | 9.1  | 6      | 13.2  |
| 37               | 150   | 5.9  | 320    | 12.6 | 232   | 9.1  | 6      | 13.2  |
| 75               | 150   | 5.9  | 320    | 12.6 | 232   | 9.1  | 6      | 13.2  |
| 110              | 150   | 5.9  | 320    | 12.6 | 232   | 9.1  | 6      | 13.2  |
| 130              | 200   | 7.9  | 320    | 12.6 | 232   | 9.1  | 8      | 17.6  |
| 170              | 200   | 7.9  | 320    | 12.6 | 232   | 9.1  | 8      | 17.6  |
| 280              | 200   | 7.9  | 370    | 14.6 | 232   | 9.1  | 9      | 19.8  |
| 350              | 175   | 6.9  | 501    | 19.7 | 340   | 13.4 | 15     | 33.1  |
| 495              | 175   | 6.9  | 501    | 19.7 | 340   | 13.4 | 15     | 33.1  |
| 650              | 175   | 6.9  | 501    | 19.7 | 340   | 13.4 | 15     | 33.0  |
| 780              | 242   | 9.5  | 787    | 31   | 505   | 19.9 | 35     | 77.2  |
| 1000             | 242   | 9.5  | 787    | 31   | 505   | 19.9 | 35     | 77.2  |
| 1500             | 242   | 9.5  | 787    | 31   | 505   | 19.9 | 35     | 77.2  |
| 2100             | 522   | 20.5 | 577    | 22.7 | 445   | 17.5 | 50     | 110.2 |
| 2900             | 593   | 23.3 | 577    | 22.7 | 473   | 18.6 | 62     | 136.7 |

MECHANICAL SPECIFICATIONS (CONTINUED)

Thyro-PX 2PX, 500 V Type Voltage

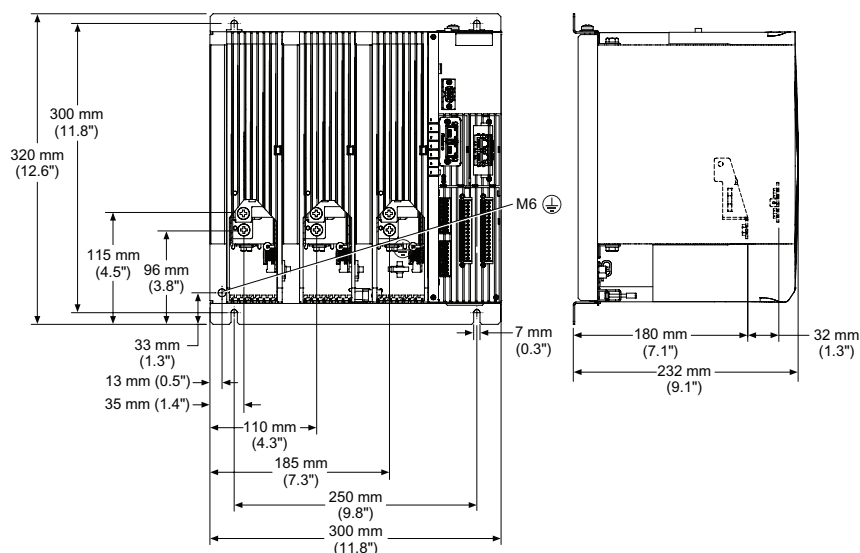


Design may change when using a fan and/or rated current > 350 A

| Dimensions       |       |      |        |      |       |      |        |       |
|------------------|-------|------|--------|------|-------|------|--------|-------|
| Type Current (A) | Width |      | Height |      | Depth |      | Weight |       |
|                  | mm    | in   | mm     | in   | mm    | in   | kg     | lb    |
| 16               | 225   | 8.9  | 320    | 12.6 | 232   | 9.1  | 10     | 22.0  |
| 37               | 225   | 8.9  | 320    | 12.6 | 232   | 9.1  | 10     | 22.0  |
| 75               | 225   | 8.9  | 320    | 12.6 | 232   | 9.1  | 10     | 22.0  |
| 110              | 225   | 8.9  | 320    | 12.6 | 232   | 9.1  | 10     | 22.0  |
| 130              | 325   | 12.8 | 320    | 12.6 | 232   | 9.1  | 12     | 26.5  |
| 170              | 325   | 12.8 | 320    | 12.6 | 232   | 9.1  | 12     | 26.5  |
| 280              | 325   | 12.8 | 415    | 16.3 | 232   | 9.1  | 15     | 33.1  |
| 350              | 261   | 10.3 | 501    | 19.7 | 340   | 13.4 | 22     | 48.5  |
| 495              | 261   | 10.3 | 501    | 19.7 | 340   | 13.4 | 22     | 48.5  |
| 650              | 261   | 10.3 | 501    | 19.7 | 340   | 13.4 | 22     | 48.5  |
| 780              | 410   | 16.1 | 787    | 31.0 | 505   | 19.9 | 54     | 119.0 |
| 1000             | 410   | 16.1 | 787    | 31.0 | 505   | 19.9 | 54     | 119.0 |
| 1500             | 410   | 16.1 | 787    | 31.0 | 505   | 19.9 | 54     | 119.0 |
| 2100             | 550   | 21.7 | 837    | 33.0 | 445   | 17.5 | 84     | 185.2 |
| 2750             | 593   | 23.3 | 837    | 33.0 | 474   | 18.7 | 107    | 235.9 |

## MECHANICAL SPECIFICATIONS (CONTINUED)

### Thyro-PX 3PX, 500 V Type Voltage



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    |
| 16               | 300   | 11.8 | 320    | 12.6 | 232   | 9.1  | 14     | 30.9  |
| 37               | 300   | 11.8 | 320    | 12.6 | 232   | 9.1  | 14     | 30.9  |
| 75               | 300   | 11.8 | 320    | 12.6 | 232   | 9.1  | 14     | 30.9  |
| 110              | 300   | 11.8 | 320    | 12.6 | 232   | 9.1  | 14     | 30.9  |
| 130              | 450   | 17.7 | 320    | 12.6 | 232   | 9.1  | 17     | 37.5  |
| 170              | 450   | 17.7 | 320    | 12.6 | 232   | 9.1  | 17     | 37.5  |
| 280              | 450   | 17.7 | 414    | 16.3 | 232   | 9.1  | 20     | 44.1  |
| 350              | 348   | 13.7 | 525    | 20.7 | 340   | 13.4 | 30     | 66.1  |
| 495              | 348   | 13.7 | 525    | 20.7 | 340   | 13.4 | 30     | 66.1  |
| 650              | 348   | 13.7 | 525    | 20.7 | 340   | 13.4 | 30     | 66.1  |
| 780              | 575   | 22.6 | 787    | 31.0 | 505   | 19.9 | 74     | 163.1 |
| 1000             | 575   | 22.6 | 787    | 31.0 | 505   | 19.9 | 74     | 163.1 |
| 1500             | 575   | 22.6 | 787    | 31.0 | 505   | 19.9 | 74     | 163.1 |
| 1850             | 550   | 21.7 | 1094   | 43.1 | 445   | 17.5 | 119    | 262.3 |
| 2600             | 593   | 23.3 | 1094   | 43.1 | 474   | 18.7 | 152    | 335.1 |

MECHANICAL SPECIFICATIONS (CONTINUED)

Thyro-PX 1PX, 690 V Type Voltage

| Dimensions       |       |      |        |      |       |      |        |       |
|------------------|-------|------|--------|------|-------|------|--------|-------|
| Type Current (A) | Width |      | Height |      | Depth |      | Weight |       |
|                  | mm    | in   | mm     | in   | mm    | in   | kg     | lb    |
| 80               | 200   | 7.9  | 320    | 12.6 | 232   | 9.1  | 8      | 17.6  |
| 200              | 200   | 7.9  | 370    | 14.6 | 232   | 9.1  | 9      | 19.8  |
| 300              | 175   | 6.9  | 501    | 19.7 | 340   | 13.4 | 15     | 33.1  |
| 500              | 175   | 6.9  | 501    | 19.7 | 340   | 13.4 | 15     | 33.1  |
| 780              | 242   | 9.5  | 787    | 31.0 | 505   | 19.9 | 35     | 77.2  |
| 1400             | 242   | 9.5  | 787    | 31.0 | 505   | 19.9 | 35     | 77.2  |
| 2000             | 522   | 20.6 | 577    | 22.7 | 445   | 17.5 | 50     | 110.2 |
| 2600             | 593   | 23.3 | 577    | 22.7 | 473   | 18.6 | 62     | 136.7 |

Thyro-PX 2PX, 690 V Type Voltage

| Dimensions       |       |      |        |      |       |      |        |       |
|------------------|-------|------|--------|------|-------|------|--------|-------|
| Type Current (A) | Width |      | Height |      | Depth |      | Weight |       |
|                  | mm    | in   | mm     | in   | mm    | in   | kg     | lb    |
| 80               | 325   | 12.8 | 320    | 12.6 | 232   | 9.1  | 12     | 26.5  |
| 200              | 325   | 12.8 | 415    | 16.3 | 232   | 9.1  | 15     | 33.1  |
| 300              | 261   | 10.3 | 501    | 19.7 | 340   | 13.4 | 22     | 48.5  |
| 500              | 261   | 10.3 | 501    | 19.7 | 340   | 13.4 | 22     | 48.5  |
| 780              | 410   | 16.1 | 787    | 31.0 | 505   | 19.9 | 54     | 119.0 |
| 1400             | 410   | 16.1 | 787    | 31.0 | 505   | 19.9 | 54     | 119.0 |
| 1850             | 550   | 21.7 | 837    | 33.0 | 445   | 17.5 | 84     | 185.2 |
| 2400             | 593   | 23.3 | 837    | 33.0 | 474   | 18.7 | 107    | 235.9 |

Thyro-PX 3PX, 690 V Type Voltage

| Dimensions       |       |      |        |      |       |      |        |       |
|------------------|-------|------|--------|------|-------|------|--------|-------|
| Type Current (A) | Width |      | Height |      | Depth |      | Weight |       |
|                  | mm    | in   | mm     | in   | mm    | in   | kg     | lb    |
| 80               | 450   | 17.7 | 320    | 12.6 | 232   | 9.1  | 17     | 37.5  |
| 200              | 450   | 17.7 | 414    | 16.3 | 232   | 9.1  | 20     | 44.1  |
| 300              | 348   | 13.7 | 525    | 20.7 | 340   | 13.4 | 30     | 66.1  |
| 500              | 348   | 13.7 | 525    | 20.7 | 340   | 13.4 | 30     | 66.1  |
| 780              | 575   | 22.6 | 787    | 31.0 | 505   | 19.9 | 74     | 163.1 |
| 1400             | 575   | 22.6 | 787    | 31.0 | 505   | 19.9 | 74     | 163.1 |
| 2000             | 550   | 21.7 | 1094   | 43.1 | 445   | 17.5 | 119    | 262.3 |
| 2200             | 593   | 23.3 | 1094   | 43.1 | 474   | 18.7 | 152    | 335.1 |

## INTERFACE

|                            |                                                                                  |
|----------------------------|----------------------------------------------------------------------------------|
| Status LEDs [Programmable] | Multiple color status LEDs for parameters:                                       |
|                            | ON/READY                                                                         |
|                            | LIMIT                                                                            |
|                            | PULSE LOCK                                                                       |
|                            | FAULT                                                                            |
|                            | POWER CONTROLLER 1 STATUS                                                        |
|                            | POWER CONTROLLER 2 STATUS                                                        |
|                            | POWER CONTROLLER 3 STATUS                                                        |
| Control Interface          | RS-232 for Thyro-Tool Pro PC software connection or optional Thyro-Touch display |
|                            | Micro USB connector for Thyro-Tool Pro PC software connection                    |
|                            | 9-pin digital I/O connector (6 digital inputs)                                   |
|                            | 9-pin analog I/O connector (3 analog inputs, 3 analog outputs)                   |
| Communication Modules      | 1 module slot for supported Anybus® digital communication protocols              |
| dASM Interface Card        | Digital and dynamic working mains load optimization                              |

## STANDARD OPTIONS

| Options                           |                                                                                                                                                 |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Digital I/O Interface Card        | 9 digital inputs and 3 digital outputs                                                                                                          |
| Analog and Digital Interface Card | 4 digital inputs                                                                                                                                |
|                                   | 3 digital outputs                                                                                                                               |
|                                   | 3 analog inputs                                                                                                                                 |
| Anybus Digital Interface Card     | Ethernet/IP®, EtherCAT® PROFIBUS®, PROFINET®, Modbus RTU®, Modbus TCP/IP®, DeviceNET™                                                           |
| Thyro-Touch Modular Display       | Multi-color multi-language, touch screen display, and menus for Thyro-PX configuration with integrated SD memory card and process data recorder |
| Thyro-Tool Pro PC Software        | PC software for commissioning, visualization, configuration, and trending                                                                       |

## Thyro-Touch Modular Display

With an integrated process data recorder, the optional Thyro-Touch unit enables intuitive operation of Thyro-PX power controllers via touch display.



| Features                                                                                                               |                           |
|------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Large 2.8" touch display for menu-driven operation                                                                     |                           |
| Multiple display modes                                                                                                 | Bar chart                 |
|                                                                                                                        | Line chart                |
|                                                                                                                        | Actual values (numerical) |
|                                                                                                                        | Data logger               |
| Integrated SD card to load or save data                                                                                |                           |
| Long-term data recording of up to 6 process parameters, as well as status messages                                     |                           |
| Analysis via Thyro-Touch tool (on PC):                                                                                 | Long-term line-chart data |
|                                                                                                                        | Status messages           |
|                                                                                                                        | PDF export                |
| EasyStart feature for easy Thyro-PX commissioning                                                                      |                           |
| Integrated low-energy Bluetooth® feature                                                                               |                           |
| Retrofits into existing Thyro-PX standard units (downward compatible to LBA-2 and LBA with limited parameter settings) |                           |
| English, German, and additional languages upon request                                                                 |                           |

## ACCESSORIES

|                                |                                                     |
|--------------------------------|-----------------------------------------------------|
| Cabinet Installation Kit (SEK) | Enables cabinet door or panel installation          |
|                                | Can be used with all Thyro-Touch and LBA-2 adapters |

## ORDERING INFORMATION

| Model    | Description                                                                                                          |
|----------|----------------------------------------------------------------------------------------------------------------------|
| Thyro-PX | Modular Digital Thyristor SCR Power Controller with current range to 2900 A, $\pm 0.5\%$ Voltage or Current Accuracy |

| Code | Phase Type                                                                                             |
|------|--------------------------------------------------------------------------------------------------------|
| 1PX  | Single phase power controller for single phase operation                                               |
| 2PX  | Two phase power controller for three phase economic circuits or 2 single phase loads (multi-zone mode) |
| 3 PX | Three phase power controller for three phase operation or 3 single phase loads (multi-zone mode)       |

| Code | AC Input Line Voltage                                         |
|------|---------------------------------------------------------------|
| 500  | Type Voltage 500 V unit: 230 V -20% to +10% [184 V to 550 V]  |
| 690  | Type Voltage 690 V units: 500 V -20% to +10% [400 V to 759 V] |

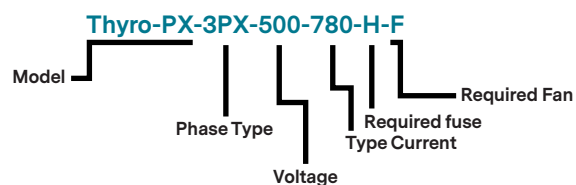
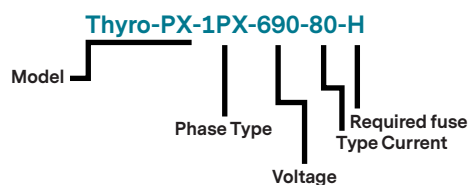
| Code                                                               | Type Current, TC | Apparent Power [kVA] |      |      |
|--------------------------------------------------------------------|------------------|----------------------|------|------|
| Available with all Phase type option codes and 500 V Type /Voltage |                  | 1PX                  | 2PX  | 3PX  |
| 16                                                                 | TC = 16 A        | 8                    | 14   | 14   |
| 37                                                                 | TC = 37 A        | 18                   | 32   | 32   |
| 75                                                                 | TC = 75 A        | 38                   | 65   | 65   |
| 110                                                                | TC = 110 A       | 55                   | 95   | 95   |
| 130                                                                | TC = 130 A       | 65                   | 112  | 112  |
| 170                                                                | TC = 170 A       | 85                   | 147  | 147  |
| 280                                                                | TC = 280 A       | 140                  | 242  | 242  |
| 350                                                                | TC = 350 A       | 175                  | 303  | 303  |
| 495                                                                | TC = 495 A       | 248                  | 429  | 429  |
| 650                                                                | TC = 650 A       | 325                  | 563  | 563  |
| 780                                                                | TC = 780 A       | 390                  | 675  | 675  |
| 1000                                                               | TC = 1000 A      | 500                  | 866  | 866  |
| 1500                                                               | TC = 1500 A      | 750                  | 1300 | 1300 |
| Available only with Phase Type Option 1PX and 500 V Type Voltage   |                  |                      |      |      |
| 2100                                                               | TC = 2100 A      | 1050                 |      |      |
| 2900                                                               | TC = 2900 A      | 1450                 |      |      |
| Available only with Phase Type Option 2 PX and 500 V Type Voltage  |                  |                      |      |      |
| 2000                                                               | TC = 2000 A      |                      | 1732 |      |
| 2750                                                               | TC = 2750 A      |                      | 2381 |      |
| Available only with Phase Type Option 3 PX and 500 V Type Voltage  |                  |                      |      |      |
| 1850                                                               | TC = 1850 A      |                      |      | 1602 |
| 2600                                                               | TC = 2600 A      |                      |      | 2251 |

ORDERING INFORMATION (CONTINUED)

| Code                                                              | Type Current, TC                                           | Apparent Power [kVA] |      |      |
|-------------------------------------------------------------------|------------------------------------------------------------|----------------------|------|------|
| Available with all Phase Type Option Codes and 690 V Type Voltage |                                                            |                      |      |      |
| 80                                                                | TC = 80 A                                                  | 55                   | 95   | 95   |
| 200                                                               | TC = 200 A                                                 | 138                  | 239  | 239  |
| 300                                                               | TC = 300 A                                                 | 207                  | 358  | 358  |
| 500                                                               | TC = 500 A                                                 | 345                  | 597  | 597  |
| 780                                                               | TC = 780 A                                                 | 538                  | 932  | 932  |
| 1400                                                              | TC = 1400 A                                                | 966                  | 1673 | 1673 |
| Available Only with Phase Type Option 1 PX and 690 V Type Voltage |                                                            |                      |      |      |
| 2000                                                              | TC = 2000 A                                                | 1380                 |      |      |
| 2600                                                              | TC = 2600 A                                                | 1794                 |      |      |
| Available Only with Phase Type Option 2 PX and 690 V Type Voltage |                                                            |                      |      |      |
| 1850                                                              | TC = 1850 A                                                |                      | 2210 |      |
| 2400                                                              | TC = 2400 A                                                |                      | 2868 |      |
| Available Only with Phase Type Option 3 PX and 690 V Type Voltage |                                                            |                      |      |      |
| 1700                                                              | TC = 1700 A                                                |                      |      | 2031 |
| 2200                                                              | TC = 2200 A                                                |                      |      | 2629 |
| Code                                                              | Integrated Semiconductor Fuse                              |                      |      |      |
| H                                                                 | 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                                                              | Additional Options <sup>2</sup>                            |                      |      |      |
| C09                                                               | PCB conformal coating                                      |                      |      |      |
| C10                                                               | 115 VAC forced air cooling via integrated fan <sup>1</sup> |                      |      |      |

<sup>1</sup> Not available with TC options < 170 A

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





For international contact information,  
visit [advanced-energy.com](http://advanced-energy.com).

[sales.support@aei.com](mailto:sales.support@aei.com)  
+1.970.221.0108

## 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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