The Basic Bus Module is an optional accessory for the Thyro-A, Thyro-A eco, Thryo-S, and Thryo-AX series power controllers. It can control up to eight power controllers, and connects to your network using a Thyro Anybus® module, which is available for many bus protocols. The module allows the power controller to be integrated into complex installations via the field network.

With the optional digital Automatic Synchronization for Multiple power controllers feature (dASM), up to 4 Basic Bus Module accessories can be interconnected to optimize the mains load for very large installations.

Related Links

- “Installing the Anybus Module” on page 2
- “Installation” on page 4
- “Operation” on page 9
INSTALLING THE ANYBUS MODULE

DANGER:
RISK OF DEATH OR BODILY INJURY. Disconnect and lockout/tagout all sources of input power before working on this unit or anything connected to it.

DANGER:
RISQUE DE MORT OU DE BLESSURES. Débrancher et verrouiller/étiqueter toutes les sources de puissance d’entrée avant de travailler sur cet appareil ou sur tout élément qui y est raccordé.

The Anybus module can be shipped separately from the Basic Bus Module accessory.

1. Verify that the unit is disconnected from all power sources.
2. Unpack the bus module at an ESD safe work space.
3. Plug the bus module into the unit.
4. Secure the module with the two TORX® T8 screws provided with the module.

For additional module documentation, scan the QR code that corresponds to the module (see the following table).

Table 1. Module documentation links

<table>
<thead>
<tr>
<th>Anybus Module</th>
<th>Link</th>
<th>QR Code</th>
</tr>
</thead>
</table>
### Table 1. Module documentation links (Continued)

<table>
<thead>
<tr>
<th>Anybus Module</th>
<th>Link</th>
<th>QR Code</th>
</tr>
</thead>
</table>

If you need to remove the Anybus module from the unit, loosen the TORX T8 mounting screws three turns, and pry out the module with a small, flat-bladed screwdriver as shown in the following figure.
INSTALLATION

⚠️ DANGER:
RISK OF DEATH OR BODILY INJURY. Disconnect and lockout/tagout all sources of input power before working on this unit or anything connected to it.

⚠️ DANGER:
RISQUE DE MORT OU DE BLESSURES. Débrancher et verrouiller/étiqueter toutes les sources de puissance d’entrée avant de travailler sur cet appareil ou sur tout élément qui y est raccordé.

⚠️ DANGER:
Personnel must receive proper training before installing or troubleshooting high-energy electrical equipment. Potentially lethal voltages could cause death, serious personal injury, or damage to the equipment. Ensure that all appropriate safety precautions are taken.
DANGER:
Le personnel devra être correctement formé avant de pouvoir installer ou dépanner des équipements électriques à haute énergie. Des tensions potentiellement létales peuvent entraîner le décès, des blessures ou des dommages à l'équipement. Assurez-vous de prendre toutes les précautions de sécurité appropriées.

WARNING:
These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that specified in the operating instructions.

AVERTISSEMENT:
Ces instructions d'entretien sont destinées uniquement à un personnel qualifié. Pour réduire le risque d'électrocution, ne pas effectuer un entretien autre que celui spécifié dans les instructions de fonctionnement.

   - If you are mounting the unit on a DIN rail, first snap the included DIN-rail clips into the back of the unit.

   ![DIN-rail clip installation]

   **Figure 3.** DIN-rail clip installation

2. Connect X22 on each power controller to X1 - X8 on the accessory using a customer-supplied shielded 2x twisted pair cable.

3. Connect the customer-supplied 24 VDC, 200 mA power supply to X11 on the Basic Bus Module accessory.
**Figure 4.** Basic Bus Module top connectors

**Figure 5.** Basic Bus Module bottom connectors

**Figure 6.** Basic Bus Module wiring diagram
Configuration Using Thyro-Tool Pro Software

TO CONFIGURE THE BASIC BUS MODULE ACCESSORY

1. Connect the Basic Bus Module accessory to the PC using a customer-supplied USB cable.
2. Start the Thyro-Tool Pro software.
3. Select **Hardware**.
4. Select the unit type from the drop-down menu for each power controller connected to ports X1 to X8.

**Important**
Select keine Auswahl if no power controller is connected to the port.

If the Thyro-A, Thyro-A eco, Thryo-S, and Thryo-AX power controllers are delivering power and the FAULT LED is not lit, the unit is functioning properly. The Basic Bus Module accessory LEDs indicate the state of each connected power controller.

**Important**
If you would like to connect the Basic Bus Module accessory to Thyro-AX units, or deal with units where fast regulation is set, it is necessary to choose the configuration fast no parameter.
OPERATION

On delivery, the power controller is parameterized to the respective power section, and the TAKT operating mode is set. You should review these standard parameters, and, if necessary, adjust them for your application.

To Operate the Thyro-A, Thyro-A eco, Thryo-S, and Thryo-AX Unit With the Basic Bus Module Accessory

1. Install the unit according to the installation procedures in this user guide.

   The minimum connections are power, load, SETPOINT, and PULSE LOCK jumper.

   ☞ Important
   By default, the unit is configured to require a customer-supplied PULSE LOCK jumper. The unit can be customer configured to not require this jumper.

2. Turn on the system circuit breakers and apply AC input to the unit and accessory.

   When the power controller receives AC input, it performs self diagnostics. If the unit detects an error, the unit sets the respective fault bits and lights the FAULT LED; if the fault is severe, the light green ON / READY LED lights. You will not be able to apply power to the load until you clear the fault.

3. Verify that the light green ON / READY LED is lit.

4. Verify that the LIMIT LED is not lit.

5. Verify that the PULSE LOCK LED is not lit.

6. Verify that the FAULT LED is not lit.

7. Verify that an increase in setpoint applies power to the load.

8. On the accessory, verify that the ON / READY LED is lit, and that the FAULT and ALARM LEDs are not lit.

If the Thyro-A, Thyro-A eco, Thryo-S, and Thryo-AX unit is delivering power and the FAULT LED is not lit, the unit is functioning properly. The Basic Bus Module accessory LEDs will indicate the state of each connected power controller.

☞ Important
AE recommends that you update the firmware to the latest revision using the Thyro-Tool Pro software.

LEDs, I/O, Digital Output, Alarm Relay

LEDs

The Basic Bus Module LED status indicators are located on the front panel of the accessory. The LED functions can be changed using the Thyro-Tool Pro software.
Figure 10. Status LEDs

Table 2. Basic Bus Module status LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Status (Default Configuration)</th>
</tr>
</thead>
</table>
| ON / READY | Green: On, ready for operation.  
Red: On, not ready for operation, check other LEDs.  
Off: No power, hardware fault. |
| FAULT | Red: A fault present.                                                                        |
| X1    | Green: The connected unit is OK.  
Red: The Basic Bus Module accessory configuration does not match the power controller type.  
Off: No unit is configured. |
| X2    | Green: The connected unit is OK.  
Red: The Basic Bus Module accessory configuration does not match the power controller type.  
Off: No unit is configured. |
| X3    | Green: The connected unit is OK.  
Red: The Basic Bus Module accessory configuration does not match the power controller type.  
Off: No unit is configured. |
| X4    | Green: The connected unit is OK.  
Red: The Basic Bus Module accessory configuration does not match the power controller type.  
Off: No unit is configured. |
| X5    | Green: The connected unit is OK.                                                             |
Table 2. Basic Bus Module status LEDs (Continued)

<table>
<thead>
<tr>
<th>LED</th>
<th>Status (Default Configuration)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Red: The Basic Bus Module accessory configuration does not match the power controller type. Off: No unit is configured.</td>
</tr>
<tr>
<td>X6</td>
<td>Green: The connected unit is OK. Red: The Basic Bus Module accessory configuration does not match the power controller type. Off: No unit is configured.</td>
</tr>
<tr>
<td>X7</td>
<td>Green: The connected unit is OK. Red: The Basic Bus Module accessory configuration does not match the power controller type. Off: No unit is configured.</td>
</tr>
<tr>
<td>X8</td>
<td>Green: The connected unit is OK. Red: The Basic Bus Module accessory configuration does not match the power controller type. Off: No unit is configured.</td>
</tr>
</tbody>
</table>

X1 TO X8 CONNECTION TERMINALS

Table 3. X1 to X8 connection terminals

<table>
<thead>
<tr>
<th>Connector</th>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1 to X8</td>
<td>1</td>
<td>Commonly switched ground potential</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>RxD</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>TxD</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Ground</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Individually switched ground potential</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Ground</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Shield</td>
</tr>
</tbody>
</table>

FAULT RELAY

The fault relay can be used to signal fault conditions in the Basic Bus Module accessory. You can change the fault relay functions using the Thyro-Tool Pro software.

Table 4. Fault relay connector X104

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Default Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>X104.1</td>
<td>Common</td>
</tr>
</tbody>
</table>
Table 4. Fault relay connector X104 (Continued)

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Default Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>X104.2</td>
<td>Normally closed</td>
</tr>
<tr>
<td>X104.3</td>
<td>Normally open</td>
</tr>
</tbody>
</table>

DIGITAL OUTPUT

The Basic Bus Module accessory can be used as an 8-channel, general purpose digital output. You can change the configuration of each output using the Thyro-Tool Pro software.

![Digital output diagram](image)

Figure 11. Digital output

MAINS LOAD OPTIMIZATION WITH dASM

The digital and dynamic dASM process offers the option of dynamic mains load optimization when multiple Thyro-A, Thyro-A eco, Thryo-S, and Thryo-AX power controllers operate in the TAKT mode.

For systems in which there are multiple power controllers, individual power controllers are synchronized so that a regular mains load is achieved. This avoids random load peaks caused by multiple power controllers switching on at the same time. The upstream transformer and/or the upstream feed point can be designed for a lower load, which results in savings in investment and operating costs, and much smaller system perturbations.

dASM can be applied whenever multiple power controllers operate together on a common grid supply in the TAKT mode. Other features include:

- Grid load optimization for up to 32 power controllers in the TAKT mode
- Grid load optimization on the basis of power consumption of the connected loads
- Dynamic grid load optimization, including the observance of setpoint or of the load alterations
- Digital operation and communication
- Grid load optimization of the dASM group within up to 5 seconds
- Suitable for 1-phase or 3-phase applications
- Simple dASM wiring with shielded RJ-45 patch cables (Ethernet CAT 5 8-pole) with a cable length between two power controllers of up to 100 m (328') depending on surrounding conditions
- Simple parameterization of monitoring features in the master unit (including configurable total power limit and number of devices)
- Monitoring the grid load (power limit)

**dASM Application Considerations**

When designing and installing, ensure that the:
- Electric load is evenly distributed onto the 3-phase system
- Parameterization and initiation of the individual power controller devices are in the TAKT mode with the same TAKT cycle period (To)
- Power wiring is correct for the phases
- 1-phase and 3-phase loads are in separate dASM groups
- Power controllers and loads of a dASM group are connected to the same grid in phase

**Important**
All digital and analog control cables must be shielded. Connect the cable shields to the shield terminal on the unit.

**dASM Commissioning**

To ensure optimal functionality of the dASM grid load optimization, make sure to do the following when commissioning:
- Check the power controller for in-phase grid connection
- Check wiring of patch cables
- Select operating mode TAKT (with the same TAKT cycle period) for all power controller devices
- Verify these parameters on the master unit:
  - dASM NO. OF DEVICES
  - dASM POWER THRESHOLD [W]
- Start up each unit in the dASM group

**dASM Notification**

The dASM grid load optimization generates the following notifications in the master unit in the event of an error:
• **dASM device number is incorrect**: Check patch cable connections/parameter dASM device number

• **dASM power limit has been exceeded**: Reduce setpoints of the assembly as appropriate

The notifications generated can be reported via:

- Fault log
- LED
- Relay
- display
- Thyro-Tool Pro software

**Errors in dASM Communication**

If the dASM communication between units is interrupted, then a new master is automatically generated in the system beyond the point of interruption. Notification: **dASM device number is incorrect**.

For example, if a cable break causes an interruption between unit 6 and unit 7, the dASM system continues to run, and unit 1 now operates as a master only for units 1 to 6 and displays that an incorrect number of units are present in the dASM network.
Please contact AE Global Services if you have questions or problems, or if you need customer support. Before contacting AE Global Services, please work through the provided troubleshooting. When you contact Global Services, please include the unit serial number and part number. These numbers are available on unit labels.

☞ Important
For returns and repairs, please contact AE Global Services to get the correct shipping address.

Primary Contact Information
Visit the Advanced Energy website for current service and support contact information:

http://www.advancedenergy.com

Alternate Contact Information
If you do not have access to the Advanced Energy website, then use one of the following:

• Phone (24 hrs/day, 7 days/week):
  800.446.9167
  or
  +1.970.221.0108

• Email: (We will respond to email by the next business day.)
  mailto:technical.support@aei.com

For Power Control Module product support, contact by phone or email:
+49 (0) 2902 910370 10 (technical support during German business hours)
mailto:powercontroller@aei.com

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