SYX66x Heating Optimiser / Compensator

The SYX 66x is a direct digital controller which is designed to suit the control needs of today’s smaller commercial and larger domestic boiler heated properties. It will control one, two or multiple boilers (via 0-10v signal), with requirements for optimum start and with direct boiler or boiler and valve compensation. The circuits are easily configured for constant temperature if required.

A separate time and output channel is provided for the control of hot water. The HWS control routines can be used independently or combined with the boilers.

The simple backlit user screen is text based and provides easy access to all relevant information. The controllers allow also remote access via a web-browser.

The controllers can be easily configured through the options on the display or via the web-browser.

**Features**
- Flexible Optimiser and Compensator Modes
- Panel Mountable with 230Vac Power Supply
- Designed to upgrade older control systems with ease
- Optional Colour Touchscreen for remote access
- Backlit user display with Info Button
- Alarm Malfunction Display (e.g. sensor alarms)
- Built-in web-browser interface for remote access
- Sensor Logging and Display

### Model Type

<table>
<thead>
<tr>
<th>Model Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>SYX660</td>
<td>Compact Heating Optimiser / Compensator using KP10 Sensors</td>
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<tr>
<td>SYX661</td>
<td>Compact Heating Optimiser / Compensator using NTC10 Sensors</td>
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<td>SYX662</td>
<td>Compact Heating Optimiser / Compensator using L&amp;G Sensors</td>
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<td>SYX663</td>
<td>Compact Heating Optimiser / Compensator using NTC10-KB Sensors</td>
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<tr>
<td>SYX664</td>
<td>Compact Heating Optimiser / Compensator using DC1100 Sensors</td>
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<tr>
<td>SYX66X-Z68</td>
<td>Mounting Frame for the Control Cabinet Door Installation</td>
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<tr>
<td>SYX66X-1RM</td>
<td>HWS Output Relay for the SYX66x Controller</td>
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<tr>
<td>BPRO-4</td>
<td>Boiler Pro Module Expanding up to 4 Boilers (2 Lo/Hi Boilers)</td>
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<tr>
<td>BPRO-10</td>
<td>Boiler Pro Module Expanding up to 10 Boilers (5 Lo/Hi Boilers)</td>
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<tr>
<td>BPRO-4A</td>
<td>Boiler Pro Module Expanding up to 4 Analogue Sequencing Boilers</td>
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<tr>
<td>IO-PMPDCO</td>
<td>Pump Change-Over Module for Twin Pump Control</td>
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<tr>
<td>LAP</td>
<td>External Time Extension Module, 0..5 hours</td>
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<tr>
<td>SYX-TPC35</td>
<td>3.5” Panel Mounting Colour TouchScreen</td>
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</tbody>
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### Technical Data

<table>
<thead>
<tr>
<th>Power Supply</th>
<th>110-230 VAC +/-10%, 50/60Hz, 21VA</th>
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<tbody>
<tr>
<td>Fuse</td>
<td>Time Delayed Power Fuse, 1.25A</td>
</tr>
<tr>
<td>Sensors</td>
<td>Outside Temperature</td>
</tr>
<tr>
<td></td>
<td>Heating Return Flow Temperature</td>
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<tr>
<td></td>
<td>Boiler Flow Temperature</td>
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<tr>
<td></td>
<td>VT Flow Temperature</td>
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<tr>
<td></td>
<td>Space Temperature 1</td>
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<tr>
<td></td>
<td>Space Temperature 2</td>
</tr>
<tr>
<td>Sensor Type</td>
<td>Ni1000-LG, NTC10K3A1, KP10, NTC10-KB, DC1100 - Selected by Controller Type</td>
</tr>
</tbody>
</table>

NOTE: Sensors required depends on the application.
Description of Configuration

The SYX66x controllers are configured by the installer in the field to provide control of simple heating plant. A SYX66x is configured in Menu driven phases. The Menus are: Overrides, Heating, Hot Water, Boilers and Connections. These options allow the controller to be easily adapted to match older and newer applications. The selection and behaviour of a menu is also further determined by the settings inside the menu itself. This allows a logical procedure through the controller configuration and fine tuning of specific sections in turn. The heating and hot water functions are independent of each other but may share some features such as the Boiler Output and Plant Overrides.

The control mode options that can be configured during set-up are:

- Optimised Start/Stop of a plant start signal with Space Frost Protection and High Limit Protection
- Optimiser Compensator of valve and/or Boiler(s) with Frost Protection
- Day Compensation of Valve and/or Boiler(s) with Night Reduced Heating for 24hr control
- Day Compensation of Valve and/or Boiler(s) with Night Frost Protection mode

Inputs

- Digital Input - Day Mode Extension Timer
- Selectable Input - Frost or Summer Mode or HWS Boiler Call

Control Outputs

- 250VAC 5(3)A Max.
- Boiler No 1 Enable
- Boiler No 2 Enable
- Heating Pump Enable
- Valve Open
- Valve Close
- HWS Timed Enable (Requires SYX66X-RO)

Analogue Outputs

- 0..10Vdc Output. Select for use by VT Valve or Boiler Setpoint 0-10v range, or Boiler Demand. (Can be used for Sequencing Boilers e.g BPRO multi-boiler modules

Display

- Backlit Graphic Display, LED "messages" for malfunctions, LED "Hand" for User Plant Override status

Operation Buttons

- SET selection knob, SELECT button, ESC button, INFO button, MESSAGES button, Alarm Acknowledge and Clear Button

Ethernet Port

- 1x Ethernet 10/100 Base-T

Operating Temp

- 0..50°C, max 95%rh non-condensing

Power Failure Backup

- 10year, battery supported clock modules, CR1225 (Renata) Battery

Enclosure

- IP20 (Controller)

CE Approval

- EN61000-6-3: 2001 (Emissions)
- EN61000-6-2: 2001 (Immunity)

Mounting

- DIN-rail Mounting

Terminals

- Removable Terminal Blocks

Dimensions

- W143.5 x H90 x D67mm (controller only)

Weight

- 500g (Controller Only)
On start-up, the settings been pre-configured to give sensible values suitable for an Optimised Radiator VT Heating System.

All of the Heating Modes are available with an optional Hot Water Service output that offers the following choices:

- Boiler Linked with adjustable Primary Set point
- Boiler Linked with adjustable Primary Set point and HWS Demand control (via Pin 10)
- Independent Hot Water Heating Time Channel.

Controller Functions

The controller offers the following functions (please refer to the manual for detailed description):

- Optimum Start and Stop; optimises the plant run on times based on the temperature required saving energy
- Day Economy; optimises the energy savings by switching the heating off during the day times if space temperature is close to the calculated heating set point.
- Three-stage frost protection; OUTSIDE FROST brings pump on and opens valve; BOILER RETURN FROST brings the heating on, SPACE TEMPERATURE FROST bring the system on in boost mode.
- Pump Run-On; dissipates the heat from the system, adjustable run-on time.
- Boiler Sequencing; up to 2 boilers are sequenced based on the demand; if more boilers required use BPRO modules
- Optional and Forced Lead Boiler Rotation; rotates the lead boiler
- Valve Exercise; prevents valve seizures and blockages in the heating system extending the equipment lifetime
- Pumps Exercise; prevent the pumps seizing up in unused periods
- Service Mode; provides full output for 30 minutes to facilitate plant servicing
- Heating Time Program; adjust the required occupation times via the LCD screen or via a web-browser; 4 periods per day
- Hot Water Time Channel; control hot water to the required times (adjustable via the LCD screen or web-browser)
• Hot Water Demand; allows boilers to run when there is true HWS demand
• Hot Water Priority Function; helps to heat the hot water cylinder faster
• Software Adjustable Heating and Hot Water Time Extensions via the backlit LCD screen or via web-browser
• Software Overrides interlocked with Time Schedules so time runs on at end of period
• Possibility to use the external Time Extension modules such as LAP5
• Operating mode override; Auto/Summer/Continuous/Frost/Service via the LCD screen or via the web-browser

• External override input for frost or summer control (e.g. Holiday or summer switch)
• Alarm Messages with event times
• BACnet integration capability to the BMS systems
• Intelligent Sensor Monitoring to enable and disable Alarms and control features
• Three distinct User Levels with individual access codes

**Configuration Window**

The controller is configured via the built-in backlit LCD screen, colour touchscreen or Web browser. The web-browser connects a PC via an Ethernet cable (cross-over) to the controller. The controller IP address is 192.168.1.99 (Access URL: http://192.168.1.99/mo/).

**Example Welcome Screen (via Web-Browser).**
Multi-Boiler Control

The SYX660 can control up to 2-boilers directly. If more than 2 boilers are required, this can be achieved using the BPRO modules. Please see the schematics below.
Twin-Pump Control

It is possible to control twin-pumps with flow proving using the IO-PMPCO Pump Change-Over Module. Please see the schematics below.

Recommended Cable Types:
- Sensors: Screened Twisted Pair
- Digital Inputs: Screened Twisted Pair
- Analogue Outputs: Screened Twisted Pair
- Digital Outputs: No specific requirements

Retro-Fitting older controllers:
- Always test then try existing cables first, if sensor value oscillation occurs then cables will need to be upgraded

Dimensions