

HVAC & R machine control solutions

Catalogue
January 2011





All technical information about products listed in this catalogue are now available on:
www.schneider-electric.com

Browse the “product data sheet” to check out :

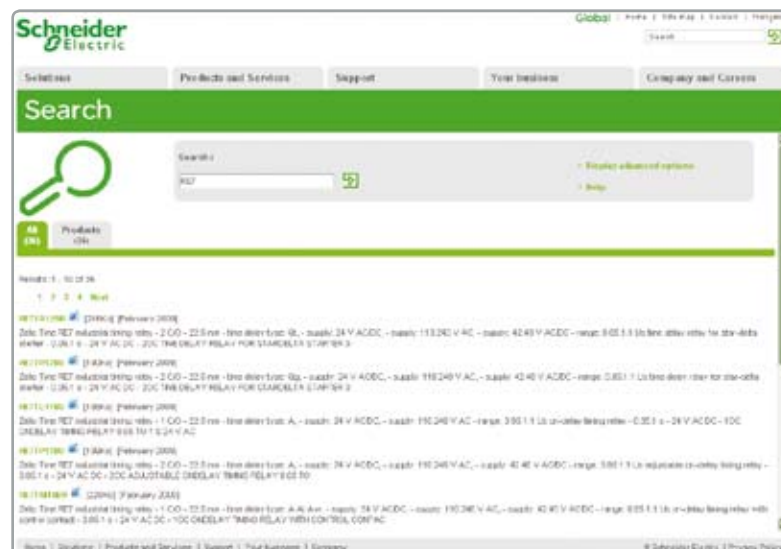
- characteristics,
- dimensions,
- curves, ...
- and also the links to the user guides and the CAD files.

1 From the home page, type the model number* into the “Search” box.



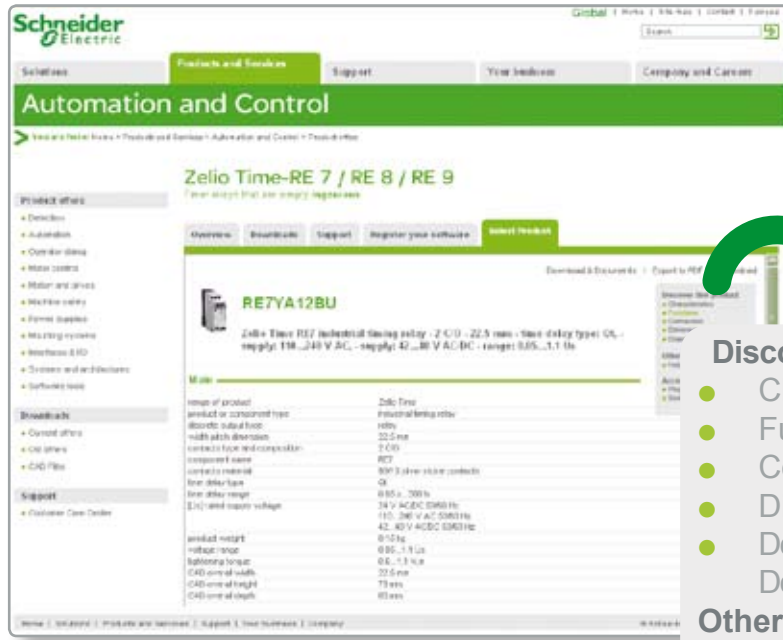
* type the model number without any blank, replace “●” by “*”

2 Under “All” tab, click the model number that interests you.



3 The product data sheet displays.

Example : Zelio Time data sheet



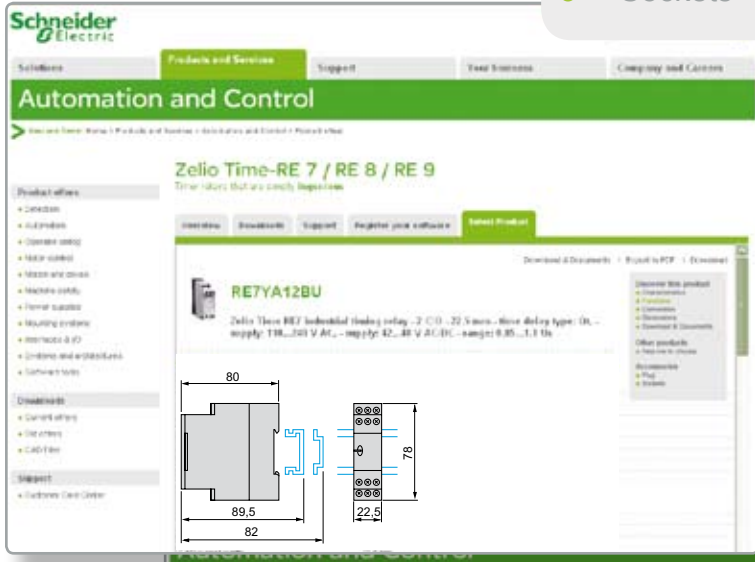
Discover this product

- Characteristics
- Functions
- Connection
- Dimensions
- Download & Documents

Other products

- Help me to choose
- Accessories**
- Plug
- Sockets

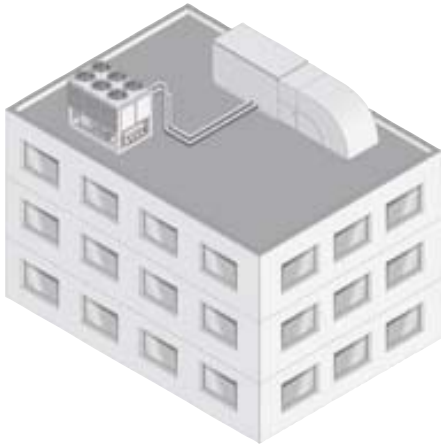
Example : Zelio Time data sheet



Example : Zelio Time data sheet



☑ You can get this information in one single pdf file.



HVAC & R systems are at the very heart of comfort and energy performance in buildings.

Your customers want HVAC & R machines:

- > robust
- > energy efficient
- > easy to maintain
- > having an excellent functionality/price ratio

This catalogue presents automation products to design your machines HVAC & R.

We can propose much more than products, we offer solutions based on Tested, Validated, Documented Architectures adapted to your needs as well as services and support throughout the complete machine life cycle allowing you:

- > Reduce your machine's time-to-market by using ready-to-use solutions
- > Increase machine performance with a better control at full and partial loads by integrating variable speed drives, using energy efficient Application Function Blocks and innovative solutions
- > Gain a competitive advantage in each stage of your machine and optimize the global cost of your machine

Simply choose your HVAC & R machine control solution according to your needs

Our HVAC & R machine control solutions are based on two types of Modicon M168 logic controller for a closer match to your requirements. These logical controllers are dedicated to targeted machines (Chiller, AHU...) or generic HVAC & R applications

Ready to use control solutions



No control expertise required

Parametric logic controller*
+ main dedicated machines control functionalities embedded

- > Quick commissioning: setting up & programme modification directly on the display, without PC
- > Ready to plug and start the machine
- > Customization possible (SoHVAC software required)

* Dedicated to chillers and AHU, others applications will be soon available

See page 10

Fully customized control solutions



Control knowledge

Generic programmable logic controller + machine program templates

- > For all types of HVAC & R machines
- > Speeds up design: machines program templates ready to be used or customized
- > Fully customization with SoHVAC software

Application programmable logic controller + Application Function blocks

- > Speeds up design : pre written application function blocks ready to be used or customized
- > Energy efficient control
- > Fully customization with SoHVAC software

See page 16

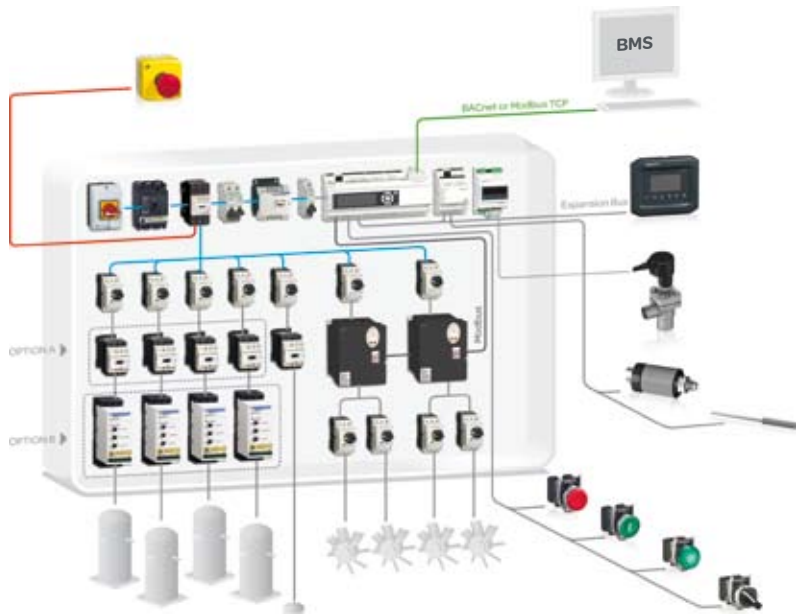
Consult your Customer Care Centre

How can you reduce your HVAC machine's time-to-market ?

Quickly build your automation solution with ready to use Tested, Validated, Documented Architectures



- > Predetermined equipment lists
- > **Tested:** in all possible configurations for proper function relative to performance
- > **Validated:** full functional compatibility of devices
- > **Documented:** a complete system user guide, predefined CAD panel design and wiring diagrams



Simplify HVAC & R machine programming and commissioning with SoHVAC software



- > Dedicated OEM HVAC software for developing, configuring and using your HVAC & R machines irrespective of your programming ability

- > **1 single software to program & commission all your automation system**
 - > Logic Controllers Modicon M168 & remote displays, FB, AFB & application machine programs, I/O, Variable Speed Drives, communication networks
- > **Reduce the complexity of your program design and implementation times**
 - > Application and standard function blocks, machine program templates, Tested, Validated & Documented Architectures
 - > Compile and debug
 - > hardware configuration tool, etc
- > **Simplify the management of your customised solutions**
 - > Simply modify, reuse or create your own function blocks or machine application programs
 - > Building Management System (BMS) open & standard : BACnet IP/WEB, BACnet MS/TP, Modbus TCP/WEB, LONWorks, KNX, ...

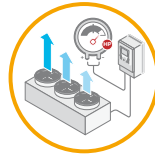
> Discover our HVAC-R machine control solutions on www.schneider-electric.com

How can you improve your machine performance at full and partial loads ?



Increase machine performance and save up to 30% on your machine energy consumption

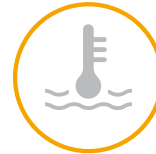
> Using **Energy Efficient** Application Function Blocks* **available in the Application programmable logic controllers**, some examples:



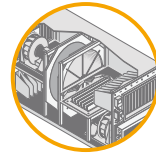
Floating high pressure with Variable Speed Drives



AHU temperature control



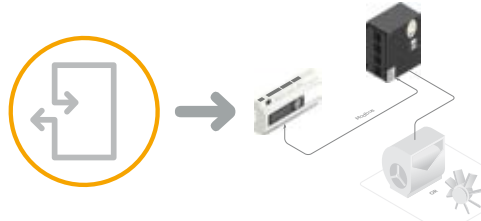
Water temperature control



Plant mode control

> Using **Variable Speed Drive**

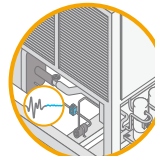
For fan ventilation applications, solutions based on Altivar drives can save up to 50% in energy consumption compared to conventional motor starter and flow regulation installations



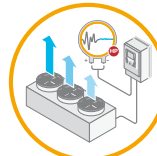
Drive communication control

> Using **innovative advanced control Application Function Blocks*** on the key functions (superheat control, high pressure control, etc.) of an Air Cooled Chiller:

- > A high performance control algorithm (better performance than PID regulation)
- > Savings in machine energy consumption as a result of the high performance and robustness of the algorithm



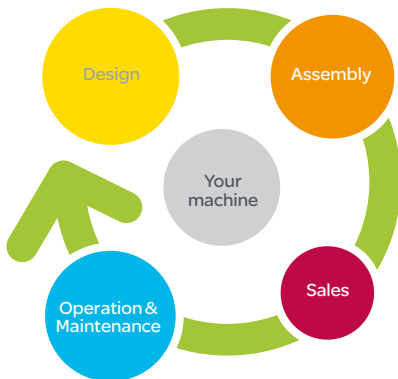
SuperHeat Advanced control



Floating High pressure Advanced control

How can you develop your business ?

Keeps you one step ahead & reduce your machine costs. We supply services and support throughout the complete machine life cycle



In order to increase customer satisfaction, your sales and profitability you must achieve excellence in each stage of your machine's life cycle. From design to maintenance, you can rely on us for assistance throughout the process:

- > **Make your machines stand outright from the start design and maximise their energy performances** with the help of our design engineers to maximise your business performance
- > **Gain in time**, rely on us to realise your control panel: we provide turnkey & customized control panel according to your precise needs
- > **Develop your sales**: Shorter delivery times of your machines due to reduced development time & sell your machines all over the world, our equipment is compliant with all international standards.
- > **Worldwide customer assistance and post sales support**: Maximize machine continuity of operation & optimize on-site intervention costs

Turkney control panel
a complete customized solution for HVAC&R machines

* Energy Efficient Application Function Blocks are dedicated for Air/Water cooled chillers & AHU. Other applications will be soon available.

Rely on a dependable partner

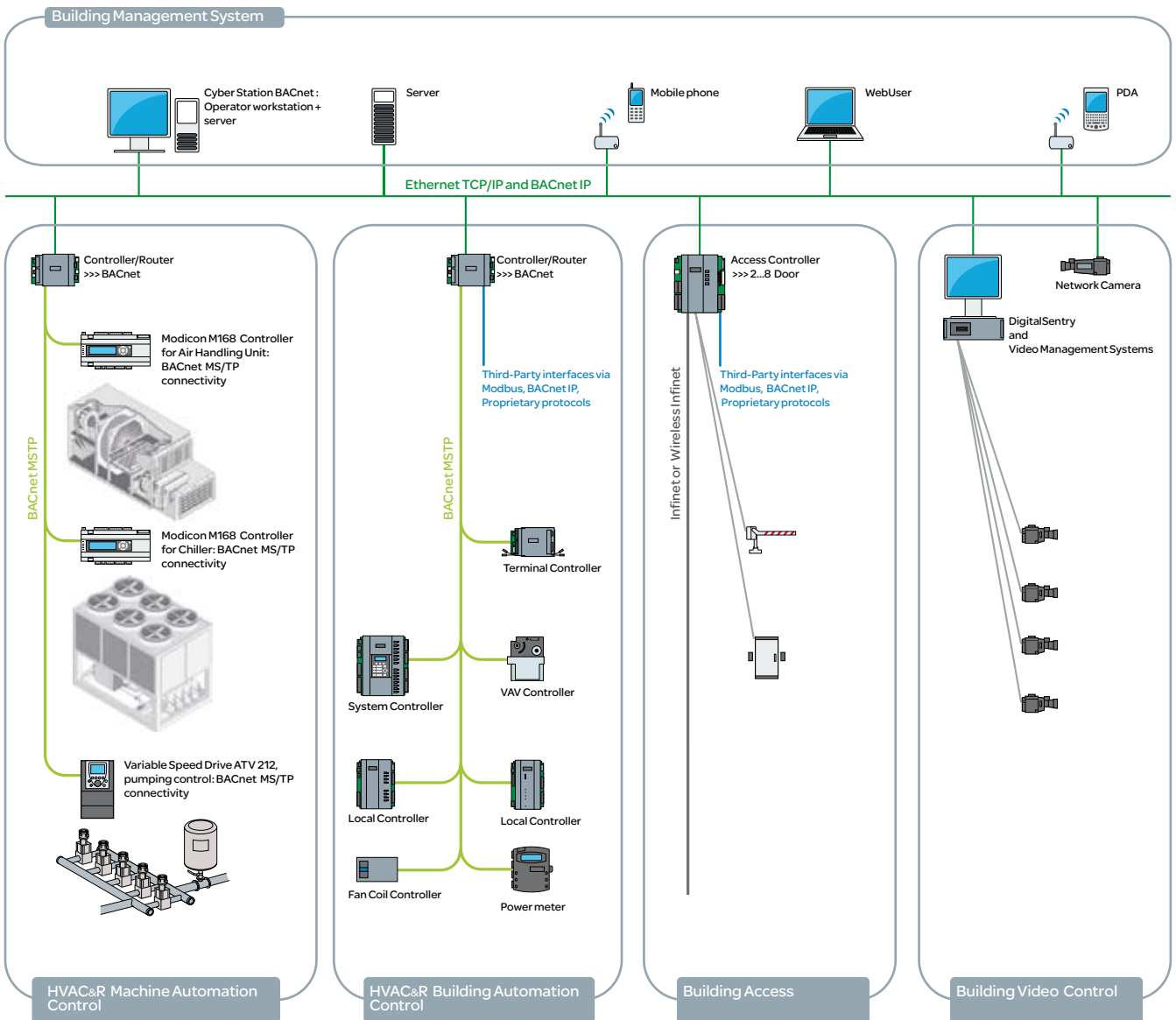
From simple stand-alone control products up to global building management systems, applying HVAC solutions can save up to 30% on energy consumption



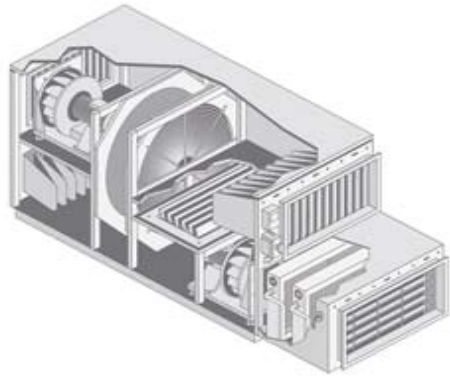
Modicon M168 offer can be easily integrated in Building Management System platforms
 We provide Building Management System (BMS) connectivity through an optional communication module.

Schneider Electric is a leading global supplier of complete building solutions. Coordinated behaviour across multiple systems can provide savings ranging from 15% to 30% of energy costs.

- > Building Automation and Control Systems contribute to equipment availability and energy savings as they can control all building functions:
 - > Mechanical and electrical equipment for heating, ventilation, air conditioning, lighting, shutters/blinds, power distribution, etc
 - > Access control, CCTV, etc. for security
 - > Engineering services enable customers to get the best energy performance



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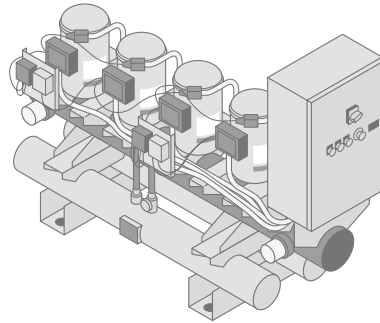
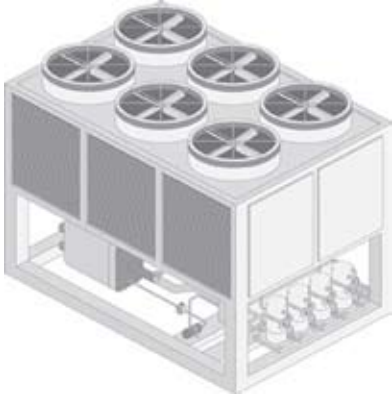
Applications		Control of air handling unit for user comfort	
			
Equipment configuration		<ul style="list-style-type: none"> ■ Up to 2 fans ■ 1 hot/cold water battery ■ Air humidification ■ Damper for fresh air and air recycling ■ Energy regeneration exchanger 	<ul style="list-style-type: none"> ■ Up to 2 fans ■ 1 cooling battery ■ 1 heating battery ■ 1 reheating battery ■ 1 electrical resistor, up to 3 stages ■ Air humidification ■ Damper for fresh air and air recycling ■ Heat recovery exchanger
Setup		Preprogrammed parametric logic controllers Parameters set via the built-in display	
Inputs	Type	<ul style="list-style-type: none"> ■ 7 discrete inputs ■ 5 configurable analog inputs 	<ul style="list-style-type: none"> ■ 7 discrete inputs ■ 5 configurable analog inputs + ■ 7 discrete inputs ■ 3 configurable analog inputs
Outputs	Type	<ul style="list-style-type: none"> ■ 8 discrete relay outputs ■ 2 configurable analog outputs 	<ul style="list-style-type: none"> ■ 8 discrete relay outputs ■ 2 configurable analog outputs + ■ 6 discrete relay outputs ■ 2 configurable analog outputs
Communication	Type and support	Modbus slave serial link by means of connection on integrated RJ45 port Modbus master/slave serial link on integrated RJ45 port BACnet MS/TP or BACnet IP with external communication modules (1) in dedicated slot on controller	
Power supply		24 V $\overline{\sim}$	
Display	Built-in	Yes	Yes (2)
	Remote	Yes (optional)	Yes (optional)
Type of parametric configuration (controller + expansion module combination)		TM168 D23AHU101●	TM168 D23AHU101● + TM168 E17
Page	Modicon M168 logic controllers	13	13
	Expansion modules	–	21

(1) Compatible with TM168 D23AHU101C, to be ordered separately
 (2) With controller TM168 D23AHU101.

Control of low-capacity water chiller (< 100 kW)

Air-cooled condenser

Water-cooled condenser



<ul style="list-style-type: none"> ■ 1 refrigerant circuit ■ Up to 2 scroll type compressors ■ 1 fan for each condenser 	<ul style="list-style-type: none"> ■ 2 refrigerant circuits ■ Up to 2 evaporators ■ Up to 4 scroll type compressors ■ Up to 2 condensers (1 fan for each condenser) 	<ul style="list-style-type: none"> ■ 1 refrigerant circuit ■ Up to 2 scroll type compressors ■ 1 water-cooled condenser 	<ul style="list-style-type: none"> ■ 2 refrigerant circuits ■ Up to 2 evaporators ■ Up to 4 scroll type compressors ■ Up to 2 water-cooled condensers
--	---	--	---

Preprogrammed parametric logic controllers
Parameters set via the built-in display

<ul style="list-style-type: none"> ■ 7 discrete inputs ■ 5 configurable analog inputs 	<ul style="list-style-type: none"> ■ 7 discrete inputs ■ 5 configurable analog inputs + ■ 7 discrete inputs ■ 3 configurable analog inputs 	<ul style="list-style-type: none"> ■ 7 discrete inputs ■ 5 configurable analog inputs 	<ul style="list-style-type: none"> ■ 7 discrete inputs ■ 5 configurable analog inputs + ■ 7 discrete inputs ■ 3 configurable analog inputs
<ul style="list-style-type: none"> ■ 8 discrete relay outputs ■ 2 configurable analog outputs ■ 1 dedicated PWM output 	<ul style="list-style-type: none"> ■ 8 discrete relay outputs ■ 2 configurable analog outputs ■ 1 dedicated PWM output + ■ 6 discrete relay outputs ■ 2 configurable analog outputs ■ 1 dedicated PWM output 	<ul style="list-style-type: none"> ■ 8 discrete relay outputs ■ 2 configurable analog outputs 	<ul style="list-style-type: none"> ■ 8 discrete outputs ■ 2 configurable analog outputs + ■ 6 discrete relay outputs ■ 2 configurable analog outputs

Modbus slave serial link by means of connection on integrated RJ45 port
Modbus master/slave serial link on integrated RJ45 port

BACnet MS/TP or BACnet IP with external communication modules (1) in dedicated slot on controller

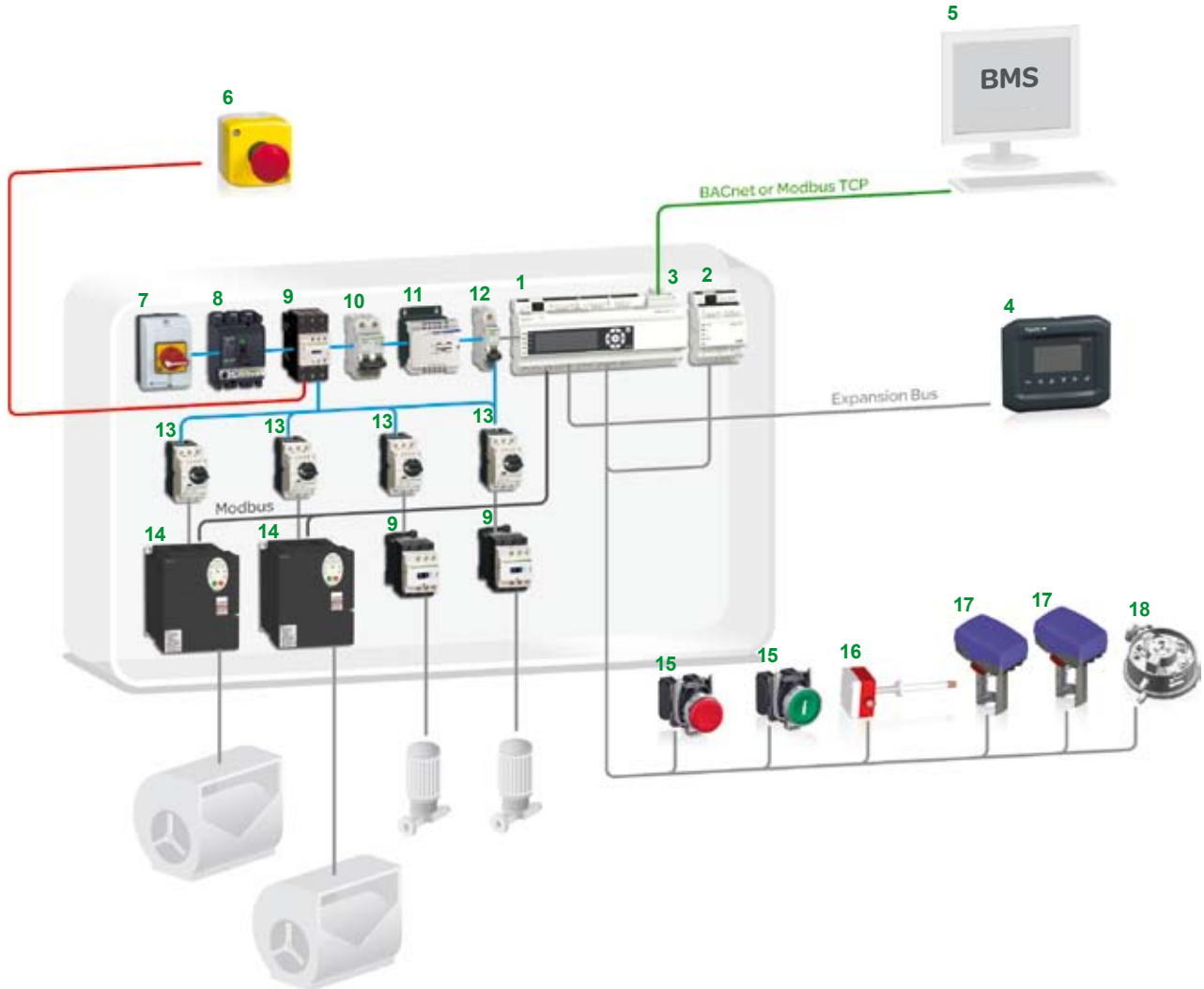
24 V $\overline{\sim}$ /~

Yes	Yes (2)	Yes	Yes (2)
Yes (optional)	Yes (optional)	Yes (optional)	Yes (optional)
TM168 D23CHL101●	TM168 D23CHL101● + TM168 E17	TM168 D23CHL101●	TM168 D23CHL101● + TM168 E17
15	15	15	15
-	21	-	21

(1) Compatible with TM168 D23CHL101C, to be ordered separately.
(2) With controller TM168D23CHL.

Presentation

Control solution for air handling unit



- | | |
|--|--------------------------------------|
| 1 Logic controller M168 D23AHU101C | 11 Phaseo transformer ABT 7PDU●●● |
| 2 I/O expansion module TM168 E17 | 12 DC circuit-breaker C60L-DC |
| 3 Communication module TM168 BAC● | 13 TeSys GV2R motor circuit-breakers |
| 4 Remote display unit TM168 GDB | 14 Altivar 212 variable speed drives |
| 5 Monitoring: Building Management Systems | 15 XB4 push-buttons |
| 6 XALK box for Emergency stop function | 16 Temperature sensors (1) |
| 7 TeSys Vario VCF switch disconnectors | 17 Air pressure sensors (1) |
| 8 Compact NSX circuit-breaker | 18 Pressure sensors (1) |
| 9 TeSys D contactors | |
| 10 Modular circuit-breaker for protecting the power supply circuit C60L-MA | |

Control functions

- Start/stop control for fan in accordance with temperature of room concerned
- Temperature control for blown-out air
- Temperature control for room concerned (cascade)
- Humidification/dehumidification control for blown-out air
- Static pressure control for blown-out air
- Free cooling and Free heating functions for temperature of blown-out air
- Heat recovery exchanger control (wheel, twin-battery)

Description

Same as Description of Generic programmable logic controllers, see page 18.

(1) For partner products, see page 30.



TM168 D23AHU101



TM168 D23AHU101C



TM168 E17



TM168 BACS



TM168 BACW



TM168 GDB



TM168 GDTS



TM168 APARAKEY

Parametric logic controllers for air handling unit

- Power supply 24 V \sphericalangle
- Built-in display
- Removable terminal kit to be ordered separately

Parametric logic controllers for air handling unit

No. of I/O	Number and type of channels		Communication ports	Item no.	Reference	Weight kg
	Inputs	Outputs				
23 I/O	<ul style="list-style-type: none"> ■ 7 discrete inputs, 24 V \sphericalangle ■ 5 configurable analog inputs 	<ul style="list-style-type: none"> ■ 8 discrete relay outputs (7 with N/C contact and 1 with C/O contact) ■ 2 configurable analog outputs 	<ul style="list-style-type: none"> <input type="checkbox"/> 1 RJ45 port: Modbus slave serial link <input type="checkbox"/> 1 RJ45 port: Modbus master/slave serial link 	–	TM168 D23AHU101	0.576
			<ul style="list-style-type: none"> <input type="checkbox"/> same as TM168 D23AHU101 + <input type="checkbox"/> 1 slot for optional communication module TM168 BAC● (1) 	1	TM168 D23AHU101C	0.790

Separate parts for parametric logic controllers

I/O expansion module (see page 20)

No. of I/O	Number and type of channels		Communication ports	Item no.	Reference	Weight kg
	Inputs	Outputs				
17 I/O	<ul style="list-style-type: none"> ■ 5 discrete volt-free contact inputs ■ 3 configurable analog inputs 	<ul style="list-style-type: none"> ■ 6 discrete relay outputs (5 with N/C contact and 1 with C/O contact) ■ 2 configurable analog outputs 	–	2	TM168 E17	0.372

Removable terminal kits

Used for	Type	For use with	Reference	Weight kg
Connecting the: <input type="checkbox"/> Power supply <input type="checkbox"/> I/O <input type="checkbox"/> Expansion bus	Screw	TM168 E17	TM168 SCTB17	0.059
		TM168 D23●●●●●	TM168 SCTB23	0.073
	Spring	TM168 E17	TM168 SPTB17	0.060
		TM168 D23●●●●●	TM168 SPTB23	0.076

Communication modules (see page 26)

Description	Protocol	Item no.	Reference	Weight kg
BACnet network communication modules	BACnet MS/TP	3	TM168 BACS	0.035
	BACnet IP	3	TM168 BACW	0.044

Remote displays (see page 22)

Description	Type	Item no.	Reference	Weight kg
Graphic displays	Display with 6 command buttons	4	TM168 GDB	0.240
	Touch screen display with 6 command buttons	–	TM168 GDTS	0.268

Parameter transfer key (see page 29)

Description	For use with	Reference	Weight kg
Key for transferring parameters to PC	Any parametric controller	TM168 APARAKEY	0.395

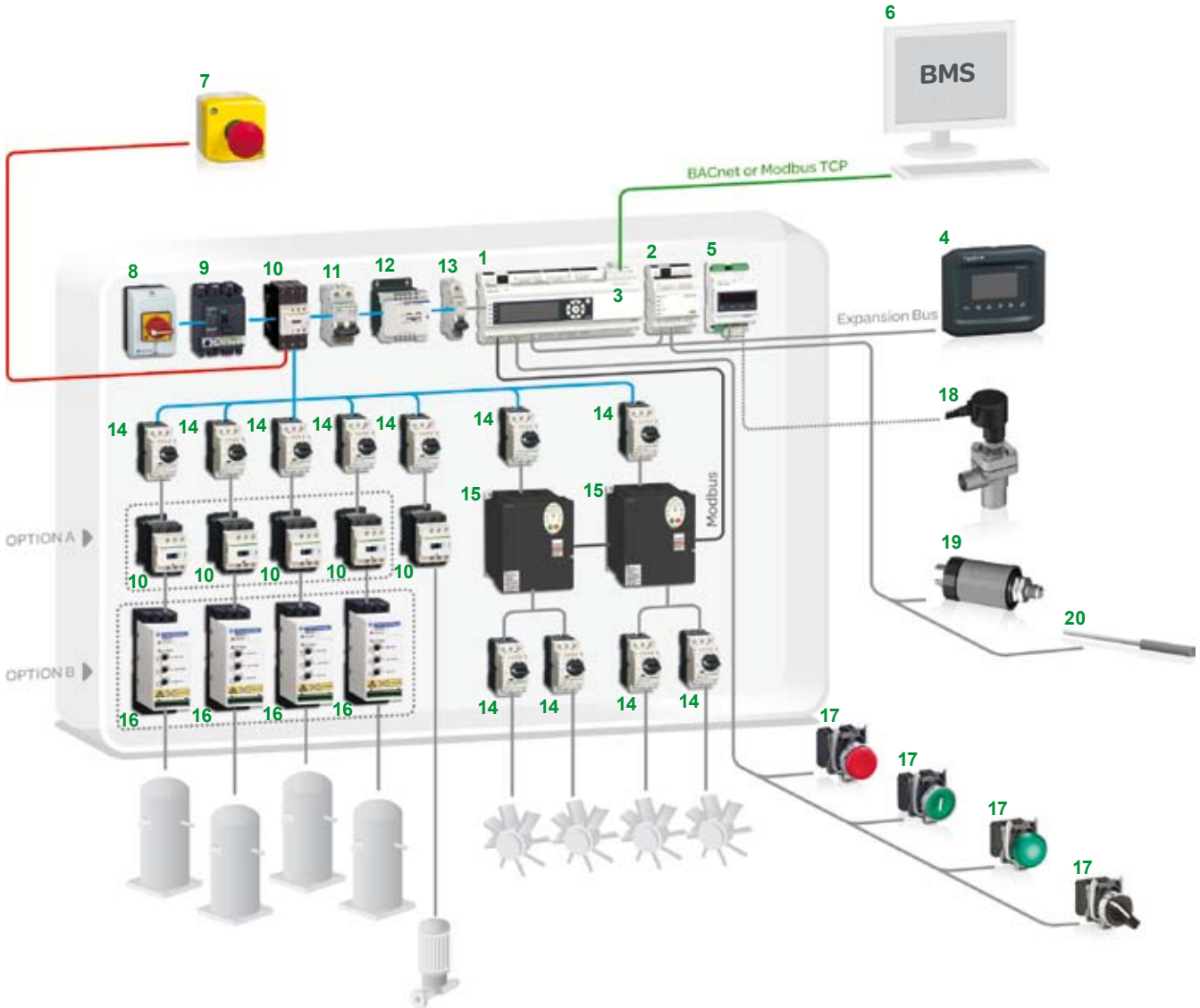
Pressure sensors and temperature probes

Description	Reference	Weight kg
Partner products	See page 30	–

(1) To be ordered separately.

Presentation

Control solution for low capacity water chiller (< 100 kW)



- | | |
|---|---|
| <ul style="list-style-type: none"> 1 Logic controller TM168 D23AHU101C 2 I/O expansion module TM168 E17 3 Communication module TM168 BAC● 4 Remote display TM168 GDB 5 Expert module: for controlling electronic expansion valve TM168 DEVCM 6 Monitoring: Building Management Systems 7 XALK box for Emergency stop function 8 TeSys Vario VCF switch disconnectors 9 Compact NSX circuit-breaker 11 TeSys D contactor | <ul style="list-style-type: none"> 11 Modular circuit-breaker for protecting the power supply circuit C60L-MA 12 Phaseo transformer ABT 7PDU●●● 13 DC circuit-breaker C60L-DC 14 TeSys GV2R motor circuit-breakers 15 Altivar 212 variable speed drives 16 Altistart 01 soft start/soft stop unit 17 XB4 push-buttons, selector switches and pilot lights 18 Electronic expansion valve (third-party product) 19 XMLP pressure transmitters 20 Temperature probes (1) |
|---|---|

Control functions

- Temperature control for water tap-off
- Variable setpoint in accordance with changes in outside temperature
- Fixed or variable high pressure
- Management of primary pumps
- Management of defrosting in accordance with changes in outside temperature

Description

Same as Description of Generic programmable logic controllers, see page 18.

(1) For partner products, see page 30.

Parametric logic controllers for low-capacity water chiller (< 100 kW)

- Power supply 24 V $\bar{\sim}$
- Built-in display
- Removable terminal kit to be ordered separately



TM168 D23CHL101



TM168 D23CHL101C

No. of I/O	Number and type of channels		Communication ports	Item no.	Reference	Weight kg
	Inputs	Outputs				
23 I/O	<ul style="list-style-type: none"> ■ 7 discrete inputs, 24 V $\bar{\sim}$ ■ 5 configurable analog inputs 	<ul style="list-style-type: none"> ■ 8 discrete relay outputs (7 with N/C contact and 1 with C/O contact) ■ 2 configurable analog outputs ■ 1 dedicated PWM output 	<ul style="list-style-type: none"> <input type="checkbox"/> 1 RJ45 port: Modbus slave serial link <input type="checkbox"/> 1 RJ45 port: Modbus master/slave serial link 	–	TM168 D23CHL101	0.576
			<ul style="list-style-type: none"> <input type="checkbox"/> same as TM168 D23CHL101 + <input type="checkbox"/> 1 slot for optional communication module TM168 BAC● (1) 	1	TM168 D23CHL101C	0.790

Separate parts for parametric logic controllers

I/O expansion module (see page 20)



TM168 E17

No. of I/O	Number and type of channels		Item no.	Reference	Weight kg
	Inputs	Outputs			
17 I/O	<ul style="list-style-type: none"> ■ 5 discrete volt-free contact inputs ■ 3 configurable analog inputs 	<ul style="list-style-type: none"> ■ 6 discrete relay outputs (5 with N/C contact and 1 with C/O contact) ■ 2 configurable analog outputs ■ 1 dedicated PWM output 	2	TM168 E17	0.372

Removable terminal kits

Used for	Type	For use with	Reference	Weight kg
Connecting the:	Screw	TM168 E17	TM168 SCTB17	0.059
		TM168 D23●●●●●	TM168 SCTB23	0.073
<input type="checkbox"/> Power supply <input type="checkbox"/> I/O <input type="checkbox"/> Expansion bus	Spring	TM168 E17	TM168 SPTB17	0.060
		TM168 D23●●●●●	TM168 SPTB23	0.076

Communication modules (see page 26)



TM168 BACS



TM168 BACW

Description	Protocol	Item no.	Reference	Weight kg
BACnet network communication modules	BACnet MS/TP	3	TM168 BACS	0.035
	BACnet IP	3	TM168 BACW	0.044

Remote display units (see page 22)



TM168 GDB



TM168 GDTS

Description	Type	Item no.	Reference	Weight kg
Graphic displays	Display with 6 command buttons	4	TM168 GDB	0.240
	Touch screen display with 6 command buttons	–	TM168 GDTS	0.268

Expert module (see page 20)

Application	Display	Item no.	Reference	Weight kg
Control of electronic expansion valve	Built-in	5	TM168 DEVCM	0.323

Parameter transfer key (see page 29)

Description	For use with	Reference	Weight kg
Parameter transfer key	Any parametric controller	TM168 APARAKEY	0.395

(1) To be ordered separately



TM168 APARAKEY



Applications		<ul style="list-style-type: none"> ■ Water chiller ■ Heat pumps ■ Compact air/air roof-top unit ■ Air handling system, twin-flow enclosure ■ Precision air conditioners ■ Refrigerated display windows 	
Used for		Programming logic controllers with SoHVAC software	
Generic programmable inputs	Discrete inputs	7 discrete inputs, 24 V $\overline{\sim}$	
	Analog inputs	5 configurable analog inputs: <ul style="list-style-type: none"> <input type="checkbox"/> 0 - 5 V ratio <input type="checkbox"/> 0 - 10 V <input type="checkbox"/> 0 - 20 mA <input type="checkbox"/> 4 - 20 mA <input type="checkbox"/> NTC <input type="checkbox"/> Pt1000 <input type="checkbox"/> PTC 	
Generic programmable outputs	Discrete outputs	8 discrete relay outputs (7 with N/C contact and 1 with C/O contact)	
	Analog outputs	2 configurable analog outputs: <ul style="list-style-type: none"> <input type="checkbox"/> 0 - 10 V <input type="checkbox"/> 0 - 20 mA <input type="checkbox"/> 4 - 20 mA 	
	Dedicated output	1 PWM output	
Communication	Built-in	Modbus slave serial link by means of connection on integrated RJ45 port Modbus master/slave serial link on integrated RJ45 port	
	Optional	–	BACnet MS/TP or BACnet IP with external communication modules (1) in dedicated slot on controller
Power supply		24 V $\overline{\sim}$ ~	
Display	Built-in	No	No
	Remote	Yes (optional)	Yes (optional)
Type of programmable base		TM168 B23	TM168 B23C
Page		19	19

(1) To be ordered separately



Programming logic controllers with SoHVAC software
Parameters set via the built-in display

–	BACnet MS/TP or BACnet IP with external communication modules (1) in dedicated slot on controller
24 V $\overline{\text{---}}/\sim$	
Yes	Yes
Yes (optional)	Yes (optional)
TM168 D23	TM168 D23C
19	19
<i>(1) To be ordered separately</i>	

Presentation

Modicon M168 generic programmable logic controllers

Modicon M168 generic programmable logic controllers have been developed to manage discrete and analog inputs and outputs, and offer numerous possibilities for connection to different Building management system communication networks. Four different Modicon M168 logic controllers are available, which can be programmed with SoHVAC software and are suitable for customized applications designed to control the following:

- Water chiller
- Heat pumps
- Compact air/air roof-top unit
- Air handling system, twin-flow enclosure
- Precision air conditioners
- Refrigerated display windows
- Compressor racks

Description

All TM168 ●23● generic programmable logic controllers comprise:

- 1 A display block for displaying the controller status: 4 LEDs (PWR, RUN, ERR and EXP) and 1 LED that can be used in the application.
- 2 A connector for a removable terminal block (1) (2 terminals) for connecting the 24 V $\overline{\text{---}}/\sim$ supply.
- 3 An RJ11 connector marked Prg. Port for connecting a programming port
- 4 A connector for a removable terminal block (1) (9 terminals), for connecting analog inputs.
- 5 A connector for a removable terminal block (1) (8 terminals), for connecting discrete inputs.
- 6 A connector for a removable terminal block (1) (5 terminals), for connecting analog outputs.
- 7 An RJ45 connector, marked MBS1, for connection to the Modbus bus.
- 8 An RJ45 connector, marked MBS2, for connection to the Modbus bus.
- 9 Five Modbus bus and expansion bus polarization and line terminator adjustment switches.
- 10 A connector for a removable terminal block (1) (3 terminals), for connecting the expansion bus.
- 11 A connector for a removable terminal block (1) (2 terminals) to connect the power supply for a remote display unit TM168 GDB● (2).
- 12 A connector for a removable terminal block (1) (5 terminals), for connecting 3 discrete relay N/C outputs.
- 13 A connector for a removable terminal block (1) (6 terminals), for connecting 4 discrete relay N/C outputs.
- 14 A connector for a removable terminal block (1) (3 terminals), for connecting the discrete relay C/O output.

TM168 B23C and TM168 D23C generic programmable logic controllers comprise:

- 15 A slot for optional communication module TM168BAC●.

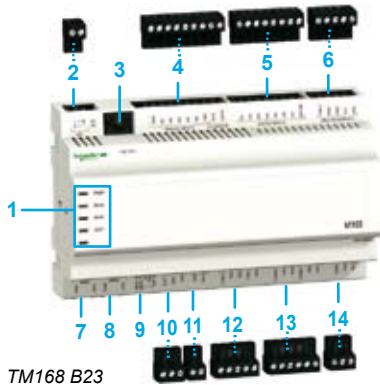
TM168 D23 and TM168 D23C generic programmable logic controllers comprise:

- 16 A display with 6 command buttons for setting the controller parameters

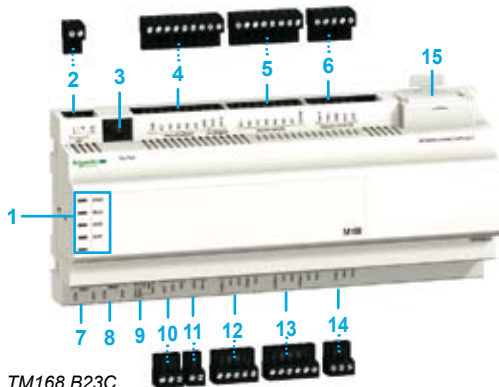
(1) Removable terminal blocks (screw or spring), included in kit TM168 SCTB●●, to be ordered separately.

(2) The remote display unit TM168 GDB● can be supplied directly by an M168 controller if the distance between the controller and the display unit is less than 30 metres.

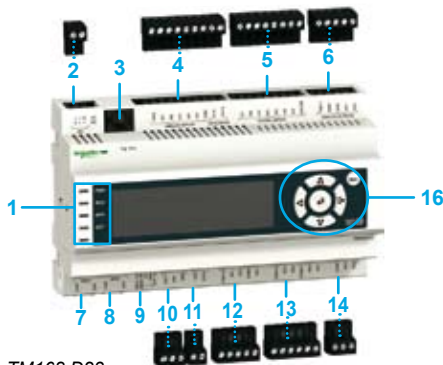
Note: M168 logic controllers are mounted as standard on a 35 mm \perp symmetrical rail.



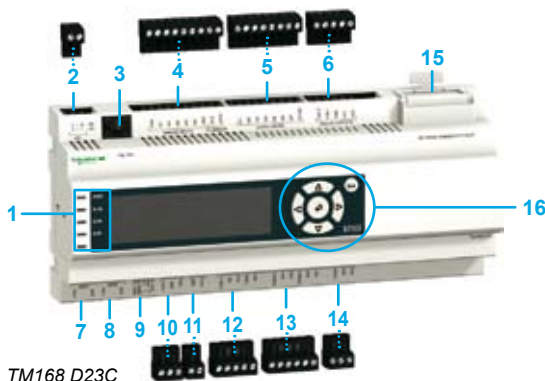
TM168 B23



TM168 B23C



TM168 D23



TM168 D23C

Generic programmable logic controllers

- Power supply 24 V \approx
- Removable terminal kit to be ordered separately

No. of I/O	Number and type of channels		Communication ports	Display	Reference	Weight kg
	Inputs	Outputs				
23 I/O	<ul style="list-style-type: none"> ■ 7 discrete inputs, 24 V \approx ■ 5 configurable analog inputs: 0 - 5 V ratio or 0 - 10 V or 0 - 20 mA or 4 - 20 mA or NTC or Pt1000 or PTC 	<ul style="list-style-type: none"> ■ 8 discrete relay outputs (7 with N/C contact and 1 with C/O contact) ■ 2 configurable analog outputs: 0 - 10 V or 0 - 20 mA or 4 - 20 mA ■ 1 dedicated PWM output 	<input type="checkbox"/> 1 RJ45 port: Modbus slave serial link <input type="checkbox"/> 1 RJ45 port: Modbus master/slave serial link	Remote (optional)	TM168 B23	0.585
			<input type="checkbox"/> same as TM168 B23 + <input type="checkbox"/> 1 slot for optional communication module TM168 BAC● (2)	Remote (optional)	TM168 B23C	0.723
			<input type="checkbox"/> 1 RJ45 port: Modbus slave serial link <input type="checkbox"/> 1 RJ45 port: Modbus master/slave serial link	Built-in	TM168 D23	0.576
			<input type="checkbox"/> same as TM168 D23 + <input type="checkbox"/> 1 slot for optional communication module TM168 BAC● (2)	Built-in	TM168 D23C	0.790



TM168 B23



TM168 B23C



TM168 D23



TM168 D23C



TM168 E17



TM168 SCTB23

Separate parts for generic programmable logic controllers

I/O expansion module

No. of I/O	Number and type of channels		Reference	Weight kg
	Inputs	Outputs		
17 I/O	<ul style="list-style-type: none"> ■ 5 discrete volt-free contact inputs ■ 3 configurable analog inputs: 0 - 5 V ratio or 0 - 10 V or 0 - 20 mA or 4 - 20 mA or NTC or Pt1000 or PTC 	<ul style="list-style-type: none"> ■ 6 discrete relay outputs (5 with N/C contact and 1 with C/O contact) ■ 2 configurable analog outputs: 0 - 10 V or 0 - 20 mA or 4 - 20 mA ■ 1 dedicated PWM output 	TM168 E17	0.372

Removable terminal kits

Used for	Type	For use with	Reference	Weight kg
Connecting the: <input type="checkbox"/> Power supply <input type="checkbox"/> I/O <input type="checkbox"/> Expansion bus	Screw	TM168 E17	TM168 SCTB17	0.059
	Spring	TM168 D23●●●●●	TM168 SCTB23	0.073
		TM168 E17	TM168 SPTB17	0.060
		TM168 D23●●●●●	TM168 SPTB23	0.076

Communication modules

Description	Protocol	Reference	Weight kg
BACnet network communication modules	BACnet MS/TP	TM168 BACS	0.035
	BACnet IP	TM168 BACW	0.044

Remote display units

Description	Type	Reference	Weight kg
Graphic displays	Display with 6 command buttons	TM168 GDB	0.240
	Touch screen display with 6 command buttons	TM168 GDTS	0.268



TM168 BACS



TM168 GDB



TM168 GDTS



TM168 DEVCM



TM168 APARAKEY

Expert module

Application	Display	Reference	Weight kg
Control of electronic expansion valve	Integrated	TM168 DEVCM	0.323

Parameter transfer key

Description	For use with	Reference	Weight kg
Parameter transfer key	Any generic programmable controller	TM168 APARAKEY	0.395

Pressure sensors and temperature probes

Description	Reference	Weight kg
Partner products	See page 30	-

Presentation

I/O expansion module

The I/O expansion module **TM168 E17** communicates via the expansion bus and is used for data acquisition and exchange in a decentralized architecture with

- 5 discrete inputs
- 3 analog inputs
- 5 discrete relay outputs with N/C contact
- 1 discrete relay output with C/O contact
- 2 configurable analog outputs (0 - 10 V or 0 - 20 mA or 4 - 20 mA)
- 1 dedicated PWM output

Expert modules

■ For controlling an electronic expansion valve
The electronic expansion valve control module **TM168 DEVCM** is used to control the electronic expansion valve so as to control overheating when the refrigerant is sucked out. It operates independently. Optionally, it can be connected to the communication interface **TM168 AVCMCOM**.

■ Battery charger for the electronic expansion valve control module
In the event of a power outage, the battery charger **TM168 AVCM** temporarily maintains the power supply to the expert module **TM168 DEVCM** in order to ensure the electronic expansion valve remains closed.

Description

I/O expansion module

I/O expansion module TM168 E17 includes:

- 1 A display block for displaying the module status: two LEDs: PWR and EXP.
- 2 A connector for a removable terminal block (1) (6 terminals), for connecting discrete inputs.
- 3 A connector for a removable terminal block (1) (2 terminals) for connecting the 24 V $\overline{\text{---}}$ /~ supply.
- 4 An RJ11 connector for connecting a programming port.
- 5 A connector for a removable terminal block (1) (6 terminals), for connecting analog inputs.
- 6 A connector for a removable terminal block (1) (5 terminals), for connecting analog outputs.
- 7 A connector for a removable terminal block (1) (3 terminals), for connecting the discrete relay C/O output.
- 8 A connector for a removable terminal block (1) (8 terminals), for connecting discrete relay N/C outputs.
- 9 A connector for a removable terminal block (1) (3 terminals), for connecting the expansion bus.

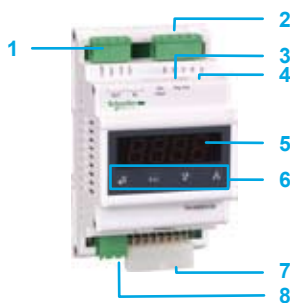
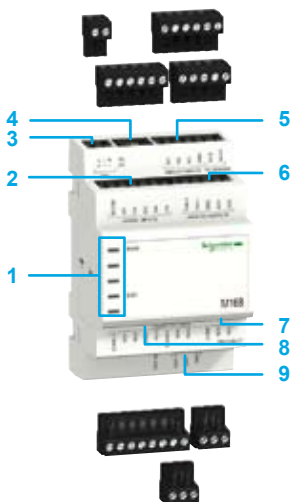
Expert module

The expert module TM168 DEVCM comprises:

- 1 A connector for a removable terminal block (1) (4 terminals), for connecting high voltage discrete inputs and discrete outputs.
- 2 A connector for a removable terminal block (1) (5 terminals), for connecting the electronic expansion valve.
- 3 A connector for a removable terminal block (1) (6 terminals) (marked Prg. Port) for connecting to the programming PC or supervision system using Modbus protocol.
- 4 Two address setting switches.
- 5 A 4-digit control display.
- 6 Four command buttons.
- 7 A connector for a removable terminal block (2) (16 terminals) to connect the 24 V $\overline{\text{---}}$ supply, for the low voltage discrete I/O.
- 8 Not used.

(1) Removable terminal blocks (screw or spring), included in kit TM168 SCTB17, to be ordered separately

Note: The expansion modules are mounted as standard on a 35 mm \perp symmetrical rail.



HVAC & R machine control solutions

I/O expansion module and expert module for Modicon M168 parametric logic controllers or generic programmable logic controllers



TM168 E17

References

I/O expansion module

- Power supply 24 V $\overline{\sim}$
- Removable terminal kit to be ordered separately

No. of I/O	Number and type of channels		Reference	Weight kg
	Inputs	Outputs		
17 I/O	<ul style="list-style-type: none"> ■ 5 discrete volt-free contact inputs ■ 3 configurable analog inputs: <ul style="list-style-type: none"> 0 - 5 V ratio or 0 - 10 V or 0 - 20 mA or 4 - 20 mA or NTC or Pt1000 or PTC 	<ul style="list-style-type: none"> ■ 6 discrete relay outputs (5 with N/C contact and 1 with C/O contact) ■ 2 configurable analog outputs: <ul style="list-style-type: none"> 0 - 10 V or 0 - 20 mA or 4 - 20 mA ■ 1 dedicated PWM output 	TM168 E17	0.372

Removable terminal kits

Used for	Type	For use with	Reference	Weight kg
Connecting the: <input type="checkbox"/> Power supply <input type="checkbox"/> I/O <input type="checkbox"/> Expansion bus	Screw	TM168 E17	TM168 SCTB17	0.059
	Spring	TM168 E17	TM168 SPTB17	0.060



TM168 DEVCM

Expert modules

Application	Display	Connection	Reference	Weight kg
Control of electronic expansion valve	Built-in	Supplied with connection terminal blocks	TM168 DEVCM	0.323

Communication interface

Function	For use with	Reference	Weight kg
TTL 485 converter Used to control the electronic expansion valve controller TM168 DEVCM via Modbus communication	Expert module TM168 DEVCM	TM168 AVCMCOM	0.321

Battery charger

Function	For use with	Reference	Weight kg
Continuity of service of the electronic expansion valve TM168 DEVCM if the power supply circuit fails	Expert module TM168 DEVCM Requires the use of a 12 V/7.2 Ah lead battery (not supplied)	TM168 AVCM	0.542

(1) Removable screw terminal blocks supplied.

(2) Removable terminal block supplied.

Note: Expert modules are mounted as standard on a 35 mm \perp symmetrical rail.

HVAC & R machine control solutions

Displays for Modicon M168 parametric logic controllers or generic programmable logic controllers

Presentation

The remote display units for M168 logic controllers communicate via the expansion bus.

They can be powered electrically via the controllers or from an external source (1).

There are 2 types of display unit:

- Monochrome display **TM168 GDB**: 128 x 64 pixels, LCD graphic screen, 6 buttons
- Monochrome display **TM168 GDTS**: 240 x 140 pixels, LCD graphic touch screen, 6 buttons

These display units can be flush-mounted or surface-mounted. They feature integrated backlighting.

The **TM168 GDTS** and **TM168 GDB** display units have a buzzer* for handling acoustic alarms.

SoHVAC programming software can be used to define and develop pages to be displayed in tandem with the application program.

In the case of configurations containing several items of equipment, a single display unit can be used to visualize more than one of these.

Description

Remote display unit TM168 GDB

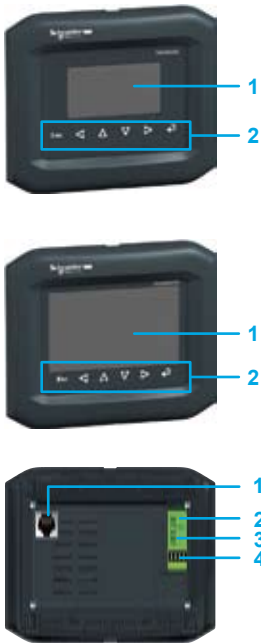
- 1 An LCD graphic screen
- 2 Six command buttons

Remote display unit TM168 GDTS

- 1 An LCD graphic touch screen
- 2 Six command buttons

Common rear view:

- 1 An RJ11 connector for updating the firmware
- 2 A power supply connector (1)
- 3 A connector for the expansion bus
- 4 Four adjustment switches for the expansion bus line terminators.



Command buttons

Button	Primary function	Secondary function
Esc	Escape	Delete the data value/return to the previous menu System command (if pressure > 3 s)
◀	Scroll to the left	Programmable secondary function
▲	Scroll up	Programmable secondary function
▼	Scroll down	Programmable secondary function
▶	Scroll to the right	Programmable secondary function
↵	Enter	Confirms the data value/sends the command System command (if pressure > 3 s)

(1) In cases where a display unit is located less than 30 metres from a Modicon M168 controller, it can be supplied directly with 24 V_{DC} by this controller.

HVAC & R machine control solutions

Displays for Modicon M168 parametric logic controllers or generic programmable logic controllers



TM168 GDB



TM168 GDTS



TM168 AGDIP65



TM168 AGD1

References

Remote displays

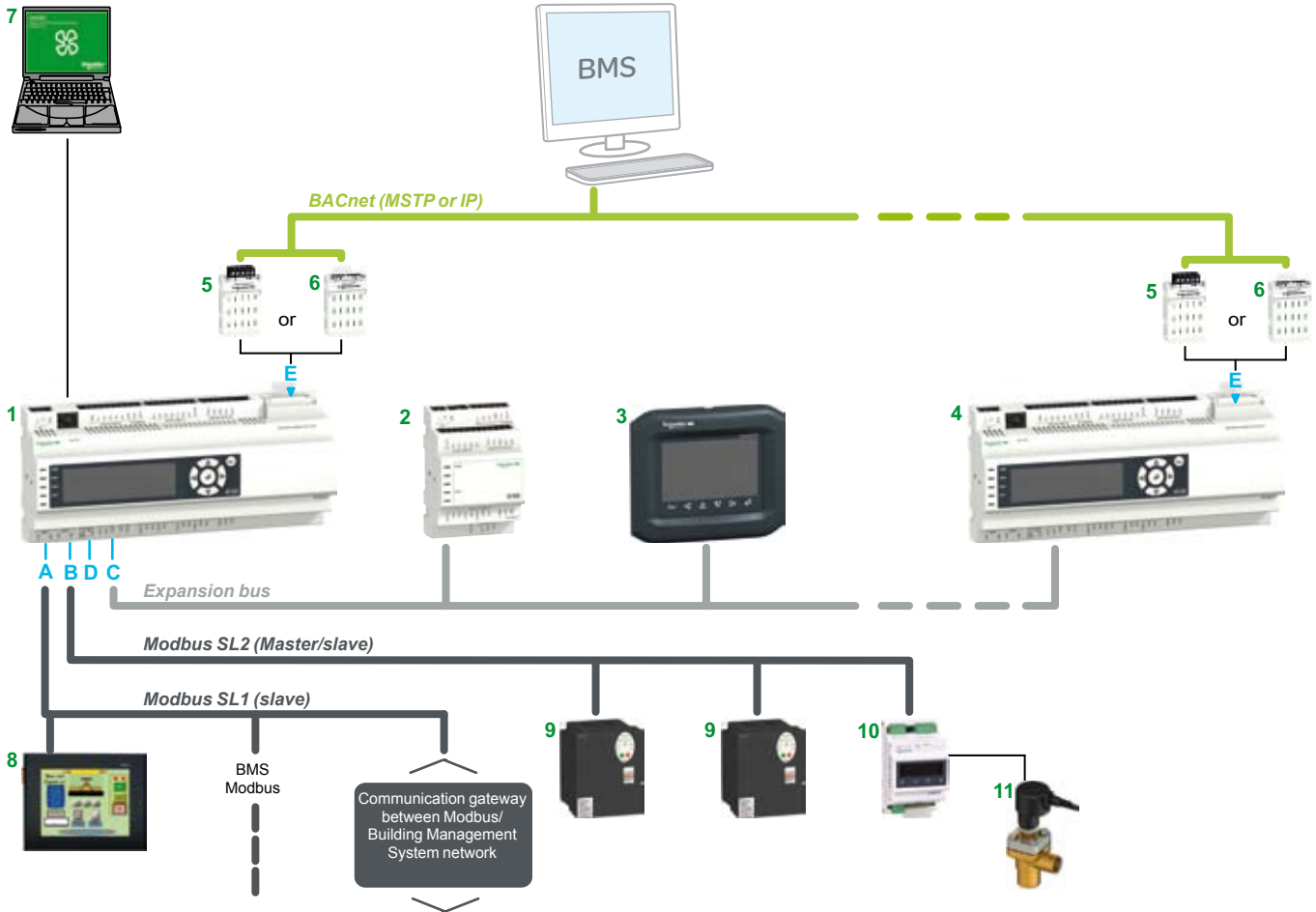
Description	Characteristics	Reference	Weight kg
Remote graphic displays	<ul style="list-style-type: none"> <input type="checkbox"/> Monochrome LCD graphic screen <input type="checkbox"/> 128 x 64 pixels <input type="checkbox"/> 6 command buttons <input type="checkbox"/> Clock <input type="checkbox"/> Acoustic alarm 	TM168 GDB	0.240
	<ul style="list-style-type: none"> <input type="checkbox"/> Monochrome LCD graphic touch screen <input type="checkbox"/> 240 x 140 pixels <input type="checkbox"/> 6 command buttons <input type="checkbox"/> Clock <input type="checkbox"/> Acoustic alarm 	TM168 GDTS	0.268

Accessories for remote displays

Description	Characteristics	Reference	Weight kg
Faceplate	<ul style="list-style-type: none"> <input type="checkbox"/> Degree of protection: IP 65 <input type="checkbox"/> 133 (W) x 112 (H) mm 	TM168 AGDIP65	0.003
Box for surface mounting	4 fixing screws included	TM168 AGD1	0.131

Presentation

Modicon M168 parametric logic controllers and generic programmable logic controllers offer numerous connection possibilities to different communication networks.



- All M168 logic controllers are designed to simplify connections to communication buses and networks, incorporating as standard:
 - Two RJ45 communication ports:
 - A slave Modbus port (A) marked MBS1
 - A master/slave Modbus port (B) marked MBS2
 - A connector (C) for a removable terminal block (1) (3 terminals), for connecting the expansion bus.
- Five switches (D) are present for adjusting the Modbus bus and expansion bus polarization and line terminators.

- TM168 ●●●●●●●●C logic controllers are designed to suit building management (BMS) configurations and have been enhanced with BACnet communication protocols (MSTP or IP): they have a slot (E) dedicated to communication modules (5 and 6) for access to the BACnet network. Two communication modules (TM168 BAC●) must be ordered separately.

- 1 Controller TM168 D23DC
- 2 I/O expansion module TM168 E17
- 3 Remote display TM168 GDB●
- 4 TM168 D23DC controller: Multi-master
- 5 Communication module TM168 BACS
- 6 Communication module TM168 BACW
- 7 PC: SoHAVC configuration software
- 8 Magelis terminal
- 9 ATV 212 variable speed drives
- 10 Expert module: for controlling electronic expansion valve TM168 DEVCM
- 11 Electronic expansion valve: third-party product

(1) Removable terminal blocks (screw or spring), included in kit TM168 SCTB●●, to be ordered separately.

Presentation (continued)

Modbus serial links

Modbus serial links are dedicated to connecting dialogue tools, variable speed drives, and Building Management Systems (BMS) in Modbus or any other protocol via gateways.

- MBS1 (Modbus slave): Magelis operator dialogue terminals, Building Management System (BMS), etc.
 - MBS2 (Modbus master/slave), to be configured with SoHVAC as:
 - slave: same as MBS1
 - master: variable speed drive controlled by Modbus (saving in the number of analog outputs and wiring time)
- Setup is made easier thanks to AFB function blocks which send commands directly to the drives, etc.

Expansion bus

The expansion bus is the physical link for transmitting incoming and outgoing data between Modicon M168 logic controllers and the I/O expansion module, remote graphic display units and expert modules.

- Each of the above-mentioned components has a dedicated connector for the expansion bus.
- The expansion bus supports the circulation and exchange of data sent by the various components which make up the control solution.
- Multi-master: The expansion bus can be used to create a multi-master configuration in cases where a number of controllers are interconnected.

BACnet network

See page 26.

Modbus serial link

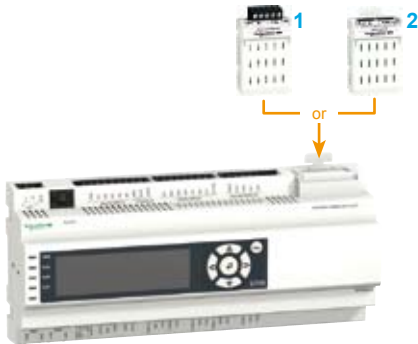
Connection accessories for remote Human-Machine Interface (1)

Description	Length m	Reference	Weight kg
Cordsets for Modbus serial link equipped with 2 RJ45 connectors	0.3	VW3 A8 306 R03	0.025
	1	VW3 A8 306 R10	0.060
	3	VW3 A8 306 R30	0.130

(1) For connecting a remote display terminal or a graphic display terminal.

HVAC & R machine control solutions

Communication modules for Modicon M168 parametric or generic programmable logic controllers



Two optional communication modules for parametric or programmable logic controllers TM168 ●●●C

Presentation

Building Management via BACnet communication modules

Two optional communication modules enable the TM168 ●●●C logic controllers to access Building Management System (BMS) networks.

TM168 ●●●C logic controllers take one single communication module at a time in the dedicated slot, which indicates the desired communication type chosen:

- TM168 BACS communication module (1): BACnet serial link, MS/TP protocol, Class B-ASC, with a removable screw connector (5 contacts for stripped wires) or
- TM168 BACW communication module (2): BACnet IP Internet protocol, Class B-ASC, with two RJ11 network access connectors.

The communication modules are directly supplied by the logic controllers once inserted in the dedicated slot.

These communication modules link the TM168●●●C logic controllers to one another and/or to other third-party BMS devices in a daisy chain topology.

The SoHVAC software solution is used to configure the setup of TM168 BAC● communication modules and variables exported to the network. The SoHVAC software solution accesses the communication modules via the logic controllers.

Additional services

Additional services are available on the Web server by using the TM168 BACW communication module.

- The Web server contains "ready-to-use" pages for water chiller and air handling unit control applications, as well as a Web page template, which can be customized for other applications. These Web pages are available in 5 languages.
- During operation, parametric logic controllers automatically detect and select of their own accord the appropriate "application" pages. The programmable controller user has to choose ready-to-use pages that are available on the Web server for water chiller or air handling unit control applications. He can also customize the Web page template provided by a Web browser, and upload it to an ftp site.
- The Web browser can be used to configure the relative IP, SNMP parameters and register third-party devices on BACnet IP. The Web browser can also monitor and perform diagnostics on the IP network parameters by collecting and displaying the network statistics and providing a log file. Access to the Web server is protected by a password.

Description

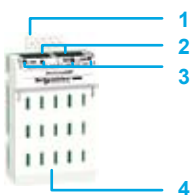
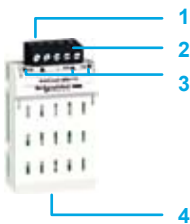
The TM168BACS communication module comprises:

- 1 An insertion and removal tab.
- 2 A connector for a removable terminal block (5-way) (1) for connection to the BACnet network, using BACnet MS/TP protocol.
- 3 Three LEDs: one LED marked MS to indicate the module status, one LED marked Tx to indicate transmission of signals and one LED marked Rx to indicate reception of signals.
- 4 A connector (50-way) for the link with the TM168●●●●C controller.

The TM168BACW communication module comprises:

- 1 An insertion and removal tab.
- 2 Two RJ45 connectors for connection to the BACnet network, using BACnet IP protocol.
- 3 Four LEDs, including one LED marked MS to indicate the module status, one LED marked NS to indicate the network status, one LED marked LNK to indicate the status of links on port 1 (RJ11) and one LED marked LNK to indicate the status of links on port 2 (RJ11).
- 4 A connector (50-way) for the link with the TM168●●●●C controller.

(1) Removable terminal block (5-way), supplied with communication module TM168BACS.



HVAC & R machine control solutions

Communication modules for Modicon M168 parametric or generic programmable logic controllers



TM168 BACS



TM168 BACW

References				
Communication modules				
Description	Characteristics	Communication port	Reference	Weight kg
BACnet network communication modules	<ul style="list-style-type: none"> ■ BACnet protocol ■ MS/TP ■ Class B-ASC ■ Alarms 	Removable terminal block (5-way), supplied with module	TM168 BACS	0.035
	<ul style="list-style-type: none"> ■ BACnet IP protocol ■ Class B-ASC with alarms ■ Web server: <ul style="list-style-type: none"> □ Embedded Web pages in 5 languages □ Ready-to-use or customizable Web pages for parametric logic controllers □ On Web browser: startup of relative IP parameters, monitoring and diagnostics □ Log file display ■ Third-party device functions 	2 RJ 45 ports with 2 collision switches in a daisy chain topology	TM168 BACW	0.044

Presentation



Software solution

SoHVAC is the software solution for HVAC & R OEM applications. It can be used to develop, configure and commission entire HVAC & R systems.

It includes:

- Programming of Modicon M168 generic logic controllers and remote display units
- Setting up expansion bus and Modbus networks
- Configuring BMS communication modules on BACnet MS/TP and IP, Lonworks, etc.

The following types of equipment can be programmed and configured with SoHVAC:

- Generic logic controllers:
 - TM168 B23
 - TM168 B23C
 - TM168 D23
 - TM168 D23C
- Remote displays:
 - TM168 GDB
 - TM168 GTS
- Communication modules:
 - TM168 BACS
 - TM168 BACW

The SoHVAC software comes with a library of application function blocks and applications which have been tested, validated and documented (TVDA). The libraries are dedicated to HVAC & R applications.

Complete parametric application programs are available for the following types of equipment:

- Air handling system
- Water chiller

General characteristics

Overview

Programming languages	<ul style="list-style-type: none"> ■ ST (Structured Text in C within a dedicated window) ■ FBD (Function Block Diagram)
Controller programming services	<ul style="list-style-type: none"> ■ Multitasking ability ■ Function blocks dedicated to HVAC & R applications ■ Programming via Function Block Diagram or Structured Text ■ Breakpoints, step-by-step execution ■ Configuration of data to be exported for BMS communication
Services for displays	<ul style="list-style-type: none"> ■ Tool for building display pages ■ Tool for page simulation
General services	<ul style="list-style-type: none"> ■ User profile and access ■ Printing project documentation ■ Comparison of projects (checking) ■ Division of variables according to a publication/subscription mechanism ■ Management of library versions
Communication bus configurators	<ul style="list-style-type: none"> ■ Control networks: <ul style="list-style-type: none"> □ Modbus serial link ■ Expansion bus fieldbus: <ul style="list-style-type: none"> □ Expansion bus ■ BMS connectivity: <ul style="list-style-type: none"> □ BACnet MS/TP □ BACnet IP
Library of application function blocks	<ul style="list-style-type: none"> ■ Function blocks for water chiller: Examples include: <ul style="list-style-type: none"> □ Control of water outflow temperature □ Compressor management □ Control of variable high pressure ■ Function blocks for air handling systems: Examples include: <ul style="list-style-type: none"> □ Control of blow-out temperature □ Pilot control of operating modes for air handling system ■ Complete parametric programs: <ul style="list-style-type: none"> □ Low-capacity water chiller □ Air handling system

Partner products to be ordered from C2AI, for Europe.
For more technical information, see www.c2ai.com

Partner products to be ordered from BAPI, for North America.
For more technical information, see www.bapihvac.com

Temperature sensors for HVAC & R equipment

Temperature probes for refrigerants

Description	Operating range (°C)	Reference (1)	
		C2AI vendor for Europe	BAPI vendor for North America
NTC probes 10 K at 25°C, β 3435 2-wire	- 40...+ 120	TT410KC●●●●	BA/10K
PT1000 probes Class B 2-wire	- 50...+ 120	TT4PT1000●●●●	BA/1K

Temperature probes and air humidity sensors

Description	Operating range (°C)	Mounting position	Reference (1)	
			C2AI vendor for Europe	BAPI vendor for North America
NTC probes 10 K at 25°C, β 3435 2-wire	- 20...+ 100	Duct mounting	SG53●●●	BA/10K-4-D●●●
		Wall mounting	DIVSONDE	BA/10K-4-R●●●
PT1000 probes Class B 2-wire	- 50...+ 100°C	Duct mounting	SG51●●●	BA/1K-4-D●●●
		- 20...+ 80°C	Wall mounting	TM51●●●

(1) ●●●●: The reference stated should be completed by the proposed vendor.

Partner products to be ordered from C2AI, for Europe.

For more technical information, see www.c2ai.com

Partner products to be ordered from BAPI, for North America.

For more technical information, see www.bapihvac.com

Humidity, temperature and CO²/VOC sensors for HVAC & R equipment

Humidity and air temperature transmitters

Description	Measurement range	Mounting position	Reference (1)	
			C2AI vendor for Europe	BAPI vendor for North America
Temperature transmitters Output voltage 0...10 V	- 50...+ 100°C	Duct mounting	SG100 VN●●●	BA/T1K-10-D●●●
Humidity transmitters Output voltage 0...10 V	0...100% relative humidity Target accuracy: □ ± 1% (+ 5...+ 80°C) □ ± 2% (- 20°C...+ 5°C)	Duct mounting	TH100 VNA●●●	BA/H200
Humidity transmitters 4 - 20 mA output or 0 - 10 mA output (2)	0...100% relative humidity Target accuracy: □ ± 1% (+ 5...+ 80°C) □ ± 2% (- 20°C...+ 5°C)	Duct mounting	TH100 ANA●●●	BA/H200-D-BB
Humidity transmitters Output voltage 0...10 V	0...100% relative humidity Target accuracy: □ ± 1% (+ 5...+ 80°C) □ ± 2% (- 20°C...+ 5°C)	Wall mounting	HM50V●●●●	BA/H200-R
Humidity and air temperature transmitters Output voltage 0...10 V	0...100% relative humidity □ 0...+ 50°C □ - 20...+ 80°C □ - 50...+ 50°C	Duct mounting	TH100 VNA●●●	BA/T1K-10-H210D-BB

CO² sensors

Description	Measured value: CO ²	Mounting position	Reference (1)	
			C2AI vendor for Europe	BAPI vendor for North America
Transmitters Output voltage 0...10 V	0...2000 ppm (3)	Duct mounting	HD37VBT●●●	-
		Wall mounting	HD37VBTV●●●	-

Description	Measured values: CO ² /temperature (°C)	Mounting position	Reference (1)	
			C2AI vendor for Europe	BAPI vendor for North America
Transmitters Output voltage 0...10 V Measurement range 0...+ 50°C	0...2000 ppm (3) /0...+ 50°C	Duct mounting	HD37V7BT●●●	-

VOC (volatile organic compound) sensors

Description	Measured value: VOC	Mounting position	Reference (1)	
			C2AI vendor for Europe	BAPI vendor for North America
Transmitters Output voltage 0...10 V Measurement range 0...+ 50°C	0...100% contaminated VOC	Duct mounting	-	BA/IEQ10-D●●
		Wall mounting	-	BA/BS3X-IEQ10●●

(1) ●●●: The reference stated should be completed by the proposed vendor.

(2) For BA/H200-D-BB only.

(3) ppm: parts per million.

HVAC & R machine control solutions

Pressure sensors for refrigerant fluid: XMLP pressure transmitters

Presentation

XMLP pressure transmitters

XMLP pressure transmitters are characterized by their “thin film” technology. The stainless steel capsule holding the sensing element is welded directly onto the transmitter stainless steel body, which has the advantage of:

- avoiding the seal coming into contact with the fluid
- making it compatible with any type of fluid

Made of 304 stainless steel, they are compact and rugged.

These transmitters are therefore dedicated to applications such as:

- Fluid circuits on any machine
- Refrigeration (HVAC).

Functions

XML P0●●BD●9 pressure sensors have a 4...20 mA or 0.5...4.5 V analog output, proportional to the available pressure ranges (10 to 600 bar).

The XML P0●●BD●9 offer is available with:

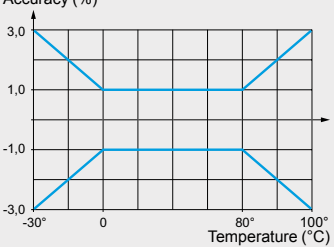
- An M12 electrical connection
- A 7/16-20 UNF-2B fluid connection

Other versions

- 0...10 V analog output
- 18 mm DIN electrical connection
- G1/4 A and 7/16-20 UNF-2A fluid connections: please consult our website www.schneider-electric.com

- GSD 207 INDUSTRIAL STANDARD electrical connection (9.4 mm): please consult our Customer Care Centre or our website www.schneider-electric.com

General characteristics

Pressure transmitters		XML P0●●BD●9	
Conformity to standards			CE RoHS, IEC/EN 60947-1, IEC/EN 60947-5-1, EN 50081, EN 50082-2, EN61000-6-2
Rated supply voltage	4-20 mA transmitters	V	12/24 ---
	0.5...4.5 V ratiometric transmitters	V	5
Voltage limits	4-20 mA transmitters	V	8...30 ---
	0.5...4.5 V --- ratiometric transmitters	V	5 (± 5%)
Current consumption		mA	< 25
Protective treatment			Standard version “TC”
Ambient air temperature	For operation	°C	- 15...+ 85
	For storage	°C	- 30...+ 100°C
	For fluid	°C	- 30...+ 100 (125°C on request)
Fluids or products controlled			Refrigerant fluid
Component materials in contact with fluid	Fluid connection		304 stainless steel
	Sensor element		17-4PH stainless steel
	External seal		Depending on model: none or FKM fluorocarbon (viton)
Operating positions			All positions
Vibration resistance			20 gn (9...2000 Hz) conforming to IEC 60068-2-6
Resistance to electromagnetic interference	Electrostatic discharges		Standard EN 61000-4-2, ± 8 kV in air, 4 kV on contact
	Radiated electromagnetic fields		Standard EN 61000-4-3, >10 V/m, 80...1000 MHz
	Rapid transients		Standard EN 61000-4-4, 1 kV
	Surges		Standard EN 61000-4-5, 1 kV
	Conducted disturbances, induced by radio frequency fields		Standard EN 61000-4-6, 3 V 0.15...80 MHz
	Magnetic fields		—
Degree of protection			IP 65 and IP 67
Output response time		ms	< 5
Accuracy			Accuracy (%) 
Service life			> 10 million operating cycles
Fluid connection			7/16-20 UNF-2B, male
Electrical connection			M12 - 4-pole



XML P0●●BD●9

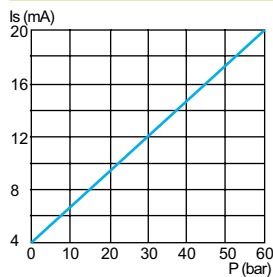
References

Fluid/electrical connection	Rating (bar)	Maximum permissible accidental pressure (bar)	Destruction pressure (bar)	Reference	Weight kg
Pressure transmitters, 4-20 mA output					
7/16-20 UNF 2B male/ M12	10 (14.5 psi)	20	30	XML P010BD29	0.050
	16 (232 psi)	32	48	XML P016BD29	0.050
	25 (362.5 psi)	50	75	XML P025BD29	0.050
	40 (580 psi)	80	120	XML P040BD29	0.050
Pressure transmitters, 0.5-4.5 V output					
7/16-20 UNF 2B male/ M12	10 (14.5 psi)	20	30	XML P010BD19	0.050
	16 (232 psi)	32	48	XML P016BD19	0.050
	25 (362.5 psi)	50	75	XML P025BD19	0.050
	40 (580 psi)	80	120	XML P040BD19	0.050

Note: XMLP sensors are sold in individual packs or in packs of 40.

Detection curve

4...20 mA output



Electrical connections (pressure transmitter connector pin view)

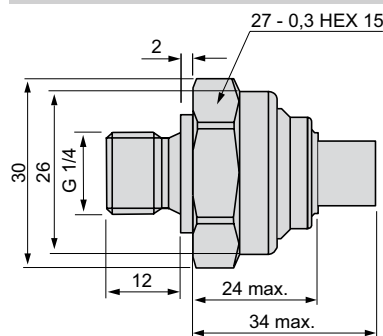
M12



Output	Contacts			
	1	2	3	4
4-20 mA	Vsup	N/C	Iout	N/C
0.5...4.5 V	Vsup	N/C	Vout	GND

Dimensions

7/16-20 UNF2B, male



Applications
Types of control

<ul style="list-style-type: none"> ■ Building pumps and fans ■ HVAC equipment
Variable speed drives for asynchronous motors



Standards and certifications

IEC/EN 61800-5-1, IEC/EN 61800-3 (environments 1 and 2, categories C1 to C3)
EN 55011: Group 1, Class A and Class B with option. CE, UL, CSA, C-Tick, NOM

Drive	Output frequency
	Type of control
	Asynchronous motor
	Synchronous motor
	Transient overtorque

0.5...200 Hz
Sensorless flux vector control
Voltage/frequency ratio (2 points)
Energy saving ratio
–
120% of nominal motor torque

Functions	Number of functions
Number of preset speeds	
Speed range	
No. of I/O	Analog inputs
	Digital inputs
	Analog outputs
	Digital outputs
	Relay outputs
Reduction in harmonic currents	

50
7
1...10
2
3
1
–
2
–

Communication	Integrated
	Available as an option

Modbus, METASYS N2, APOGEE FLN, BACnet
LonWorks

Cards (optional)
Dialogue tools
Configuration tools

–
IP 54 or IP 65 remote display terminal
PCSoft setup software for ATV 212
Multi-Loader configuration tools

Supply voltage
Motor power for 50...60 Hz line supply

Three-phase 200...240 V	Three-phase 380...480 V
0.75...75 kW	0.75...75 kW

Motor power (kW-HP)	Line current (A)			
	200 V	240 V	380 V	480 V
0.37 - 0.5	6.9	5.8	–	–
0.75 - 1	12	9.9	–	–
1.5 - 2	18.2	15.7	–	–
2.2 - 3	25.9	22.1	–	–
3	25.9	22	–	–
4 - 5	34.9	29.9	–	–
5.5 - 7.5	47.3	40.1	–	–
0.75 - 1	3.3/6.1	2.7/5.3	1.7	1.4
1.5 - 2	6.1/11.3	5.1/9.6	3.2	2.5
2.2 - 3	8.7/15	7.3/12.8	4.6	3.6
3	–/19.3	10/16.4	6.2	4.9
4 - 5	14.6/25.8	13/22.9	8.1	6.4
5.5 - 7.5	20.8/35	17.3/30.8	10.9	8.6
7.5 - 10	27.9/45	23.3/39.4	14.7	11.7
11 - 15	42.1/53.3	34.4/45.8	21.1	16.8
15 - 20	56.1/71.7	45.5/61.6	28.5	22.8
18.5 - 25	67.3/77	55.8/69	34.8	27.8
22 - 30	80.4/88	66.4/80	41.6	33.1
30 - 40	113.3/124	89.5/110	56.7	44.7
37 - 50	–/141	–/127	68.9	54.4
45 - 60	–/167	–/147	83.8	65.9
55 - 75	–/200	–/173	102.7	89
75 - 100	–/271	–/232	141.8	111.3
90 - 125	336	288	–	–

References (without EMC filter)	References with integrated EMC filter, categories C1, C2 or C3
–	–
–	–
–	–
–	–
–	–
–	–
–	–
–	–
ATV 212H075M3X	ATV 212H075N4
ATV 212HU15M3X	ATV 212HU15N4
ATV 212HU22M3X	ATV 212HU22N4
ATV 212HU30M3X	ATV 212HU30N4
ATV 212HU40M3X	ATV 212HU40N4
ATV 212HU55M3X	ATV 212HU55N4
ATV 212HU75M3X	ATV 212HU75N4
ATV 212HD11M3X	ATV 212HD11N4
ATV 212HD15M3X	ATV 212HD15N4
ATV 212HD18M3X	ATV 212HD18N4
ATV 212HD22M3X	ATV 212HD22N4
ATV 212HD30M3X	ATV 212HD30N4
–	ATV 212HD37N4
–	ATV 212HD45N4
–	ATV 212HD55N4
–	ATV 212HD75N4
–	–

(1) Other voltages available (Three-phase 380...480 V or three-phase 500...690 V), please consult our "Altivar 61 variable speed drives" catalogue or our website www.schneider-electric.com
 (2) For motors with a higher rating than 90 kW, please consult our "Altivar 61 variable speed drives" catalogue or our website www.schneider-electric.com

- Industrial pumps and fans
- HVAC equipment
- Compressors

Variable speed drives for asynchronous motors



IEC/EN 61800-5-1, IEC/EN 61800-3 (environments 1 and 2, categories C1 to C3), IEC/EN 61000-4-2/4-3/4-4/4-5/4-6/4-11, CE, UL, CSA, DNV, C-Tick, NOM, GOST

0.1...500 Hz for the whole range

0.1...599 Hz up to 37 kW in 200...240 V ~ and 380...480 V ~

Sensorless flux vector control

Voltage/frequency ratio (2 or 5 points)

Energy saving ratio

Vector control without speed feedback

120% of nominal motor torque for 60 seconds

> 100

8

1...100 in open loop mode

2...4

6...20

1...3

0...8

2...4

DC choke integrated or supplied with the drive

Modbus and CANopen

Modbus TCP Daisy Chain, Modbus/Uni-Telway, EtherNet/IP, DeviceNet, PROFIBUS DP V0 and V1, INTERBUS, CC-Link, LonWorks, METASYS N2, APOGEE FLN, BACnet

I/O expansion cards, Controller Inside programmable card, Altivar IMC integrated controller card, multi-pump cards, encoder interface cards (2)

IP 54 or IP 65 remote display terminal

SoMove setup software

Simple Loader and Multi-Loader configuration tools

Single-phase 200...240 V

Three-phase 200...240 V (1)

0.37...630 kW (2)

0.37...630 kW (2)

0.37...630 kW (2)

References with integrated EMC filter, categories C1, C2 or C3	References with integrated EMC filter (up to 7.5 W), category C2	References (without EMC filter)
ATV 61H075M3	-	-
ATV 61HU15M3	-	-
ATV 61HU22M3	-	-
ATV 61HU30M3	-	-
ATV 61HU40M3	-	-
ATV 61HU55M3	-	-
ATV 61HU75M3	-	-
-	ATV 61H075M3	-
-	ATV 61HU15M3	-
-	ATV 61HU22M3	-
-	ATV 61HU30M3	-
-	ATV 61HU40M3	-
-	ATV 61HU55M3	-
-	ATV 61HU75M3	-
-	-	ATV 61HD11M3X
-	-	ATV 61HD15M3X
-	-	ATV 61HD18M3X
-	-	ATV 61HD22M3X
-	-	ATV 61HD30M3X
-	-	ATV 61HD37M3X
-	-	ATV 61HD45M3X
-	-	ATV 61HD55M3X
-	-	ATV 61HD75M3X
-	-	ATV 61HD90M3X

Controlled starting and deceleration of simple and complex machines



IEC/EN 60947-4-2, EMC class A, CE, UL, CSA, C-Tick, GOST, CCC

IEC/EN 60947-4-2, EMC classes A and B, CE, UL, CSA, DNV, C-Tick, GOST, CCC, NOM 117, SEPRO and TCF

3

3

Configurable voltage ramp

TCS (Torque Control System)

Standard

Standard and severe

Integrated

Available as an option

1 PTC probe

1 PTC probe

3 programmable

4

–

1

–

2

2 programmable (N/C or N/O)

3

Integrated display terminal

Integrated display terminal, optional remote display terminal

SoMove Lite software workshop

PowerSuite software workshop

Modbus

Modbus

–

Fipio, PROFIBUS DP, DeviceNet, Modbus TCP

Three-phase 380...415 V
0.75...15 kW

Three-phase 440...480 V
0.75...15 kW

Three-phase 230...440 V (2)
4...355 kW (3)

Three-phase 230...415 V (2)
3...630 kW (3)

–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
ATS 01N206QN	ATS 01N206RT	–	–
ATS 01N209QN	ATS 01N209RT	–	–
ATS 01N212QN	ATS 01N212RT	–	–
ATS 01N222QN	ATS 01N222RT	–	–
ATS 01N232QN	ATS 01N232RT	–	–
–	–	ATS 22D17Q	ATS 48D17Q
–	–	–	ATS 48D22Q
–	–	ATS 22D32Q	ATS 48D32Q
–	–	–	ATS 48D38Q
–	–	ATS 22D47Q	ATS 48D47Q
–	–	ATS 22D62Q	ATS 48D62Q
–	–	ATS 22D75Q	ATS 48D75Q
–	–	ATS 22D88Q	ATS 48D88Q
–	–	ATS 22C11Q	ATS 48C11Q
–	–	ATS 22C14Q	ATS 48C14Q
–	–	ATS 22C17Q	ATS 48C17Q
–	–	ATS 22C21Q	ATS 48C21Q
–	–	ATS 22C25Q	ATS 48C25Q
–	–	ATS 22C32Q	ATS 48C32Q
–	–	ATS 22C41Q	ATS 48C41Q
–	–	ATS 22C48Q	ATS 48C48Q
–	–	ATS 22C59Q	ATS 48C59Q
–	–	–	ATS 48C66Q
–	–	–	ATS 48C79Q
–	–	–	ATS 48M10Q
–	–	–	ATS 48M12Q

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