SIEMENS

Technical Instructions

Document No. 155-737

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RWD62U

Universal Controller

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Description

The Universal controller is intended for heating, air conditioning, ventilation and refrigeration in comfort control applications. RWD62U main loop control applications are designed for temperature, static pressure, humidity, air pressure, fluid pressure, refrigeration, air quality and air fluid velocity control. The controller contains pre-programmed applications.

Auxiliary control functions include:

- Day/night setpoints
- Remote setpoint control
- Limiter control
- Cascade control
- Maximum priority
- Setpoint reset
- Summer/winter operation

Control parameters are adjusted for maximum comfort control via three buttons on the face of the device, or with a laptop computer and Siemens Building Technologies program software.

NOTE: For complete supporting technical documentation, including training presentations, see www.us.sbt.siemens.com/hvp/components.

Features

- Stand-alone electronic temperature controller with P or P+I response
- 24 Vac operating voltage
- Control application selectable via Application Number
- Active input scale can be selectable
- Limit and direction of the output scale can be freely assigned
- Two universal inputs for Siemens 1000 ohm nickel (Ni 1000), 1000 ohm platinum (Pt 1000) temperature sensors and 0 Vdc to 10 Vdc signals
- Unit can be set as °F, °C, % or no specified unit
- Two modulating 0 to 10 Vdc signal outputs, direct or reverse action
- One digital input for day/night changeover
- Entering or changing of all data via operating buttons on the controller, possible without additional tools
- Computer connection for downloading canned applications via the software tool

Product Number

RWD62U

Warning/Caution Notations

CAUTION:		Equipment damage may occur if you do not follow a procedure as specified.

Specifications

Power Supply	Operating voltage	24 Vac ± 20%
	Frequency	50/60 Hz
	Power consumption	2.5 VA
LCD	Actual and nominal values	Four digits
Setpoint adjustment range		-58°F to 302°F (-50°C to 150°C)
Display Resolution (does not relate to controller accuracy)	Siemens Ni 1000 ohm	1°F (0.5°C)
	Pt 1000 ohm	1°F (0.5°C)
	Active sensor	Depends on setting range
Environmental Conditions	Storage and transport	
	Temperature	-13°F to 158°F (-25°C to 70°C)
	Humidity	<95% rh
	Operation	
	Temperature	32°F to 122°F (0°C to 50°C)
	Humidity	<95% rh
Regulatory Approvals	CE	Conforms to CE requirements
	UL	UL listed to 916 Energy Management Equipment
Terminals	Screw terminals, min./max. conductors	Minimum: 24 AWG (1) Maximum: 16 AWG (2), or 14 AWG (1)
Weight	RWD62U Controller	10.4 oz (295 grams)
	With packaging	12.24 oz (347 grams)
Analog Inputs X1, X2 Siemens Ni 1000 ohm @ 32°F (0°C)	Controller measuring range	-58°F to 302°F (50°C to 150°C)
	Maximum cable length for 14 AWG	Maximum 984 ft (300 m)
Pt 1000 ohm at 32°F (0°C)	Controller measuring range	-4°F to 356°F (-20°C to 180°C)
	Maximum cable length for 14 AWG	Maximum 984 ft (300 m)
Analog voltages (For measured variable in °F, °C, % or without unit)	Range	0 to 10 Vdc corresponding to adjustable range from –100 to 8000 (°C, °F, % or no unit)
	Maximum cable length for 14 AWG	Maximum 984 ft (300 m)
Remote setpoint X2	Range	0 to 1000 ohm corresponding to adjustable range from –100 to 8000 (°C, °F, % or no unit)
	Maximum cable length for 14 AWG	Maximum 984 ft (300 m)
Digital input D1	Polling voltage for control commands (D…M)	15 Vdc
	Current consumption	<15 mA
Analog outputs Y1, Y2	Range	0 to 10 Vdc
	Maximum current	±1 mA

Accessories

ARG62.21	Protective enclosure for wall mounting.
SEH62.1U	Program Clock
SEM62.2U	24/120 Vac Transformer
125-3481	RWD Controller Programming Tool (CD)
RWDTKU	Tool Kit

Function Summary

- Controller
  Stand-alone controller with two 0 to 10 Vdc outputs with independent adjustment on each sequence for direct acting and/or reverse acting. Adjustable parameters, including proportional band and integral action time.
- Auxiliary selectable function
- Universal input X2 for one of the following auxiliary functions:
  - P+I limiter function (Absolute and Relative)
  - Remote setpoint
  - Cascade control
  - Setpoint reset
  - Winter/summer operation
  - Maximum priority
- Digital input D1 for setpoint changeover day/night

Equipment Combinations

The following Siemens devices can be connected to RWD62U Universal Controllers. Other combinations with units from third-party manufacturers are possible, if the input and output specifications match the RWD62U.

Table 1.

Description	Document Number
Sensor with Siemens Ni 1000 temperature sensing element QAA25U Room temperature sensor with setpoint adjuster	155-330
GIB Series 310 lb-in Non Spring Return Actuators GBB Series 177 lb-in Non Spring Return Actuators	155-176P25 155-177P25
GEB Series 132 in-lb Non Spring Return Actuators	155-318P25
GCA Series 142 in-lb Spring Return Actuators	155-173P25 155-174P25 155-175P25
GMA Series 62 in-lb Spring Return Actuators	155-315P25
SKD Valve Actuator with proportional input	155-180P25
SKB/SKC Valve Actuator with proportional input	155-163P25
SQX Valve Actuator with proportional input	155-182P25
SQS Valve Actuator with proportional input	155-190P25
SSC Valve Actuator with proportional input	155-313P25
SSB Valve Actuator with proportional input	155-192P25
Electric Rack and Pinion proportional actuator	155-541P25
1/2 to 2-inch two-way globe valves	155-184P25
1/2 to 2-inch three-way globe valves	155-185P25
2-1/2 to 6-inch two-way flange valves	155-159P25
2-1/2 to 6-inch three-way flange valves	155-160P25
MT Series 1/2 to 1-1/2-inch two-way globe valves	155-196P25
MT Series 1/2 to 1-1/2-inch three-way globe valves	155-197P25
MZ Series 1/2 to 1-inch two-way globe valves	155-198P25
MZ Series 1/2 to I-inch three-way ball valves	155-199P25
Differential Pressure Sensor	155-719

Software Tool

An optional, user-friendly, Windows® 95 (or later) based software tool for controller application selection and parameter adjustment is available. It provides you with a printout of the controller settings. This tool allows controller programming prior to installation.

Functions

Controller Type

The RWD62U is a stand-alone universal controller, which performs both primary and auxiliary control functions. The respective mode is defined by entering the corresponding configuration and setting parameters via the push buttons on the controller or the software tool.

Main Functions

The RWD62U controller can be programmed as follows:

- One sequence: Y1 or Y2 Reverse or direct acting
- Two sequences: Y1 and Y2 Reverse and direct acting or
  Y1 and Y2 Reverse and reverse acting or
  Y1 and Y2 Direct and direct acting

NOTE: Direct Acting – As air temperature increases, the control output increases.

Reverse Acting – As air temperature increases, the control output decreases.

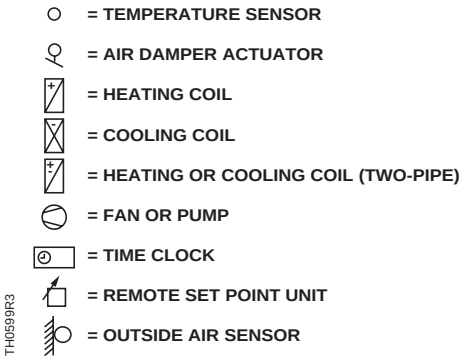


Figure 1. Frequently Used Symbols in Application Drawings.

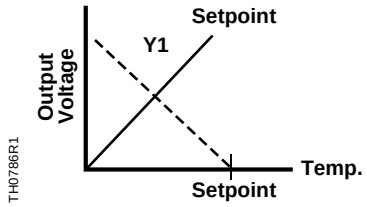


Figure 2. One Sequence Heat, Direct Acting or Reverse Acting (Application 10 to 19).

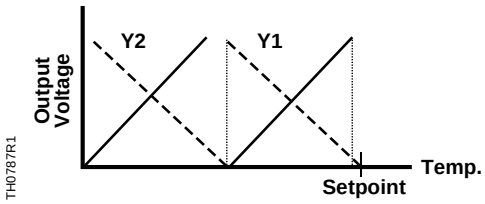


Figure 3. Two Sequence Heat, Two Direct Acting or Two Reverse Acting Sequences (Application 20 to 29).

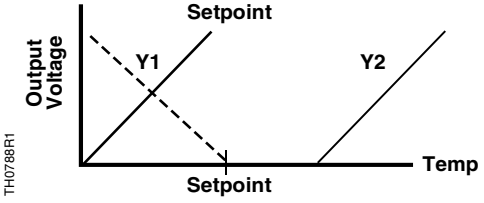


Figure 4. One Direct Acting Heat and One Direct Acting Cool or One Reverse Acting Heat and One Direct Acting Cool Sequence (Application 30 to 39).

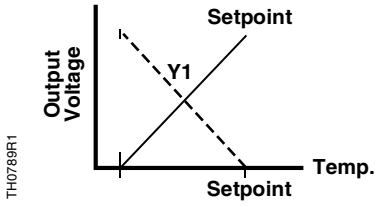


Figure 5. One Direct Acting Cool or One Reverse Acting Cool Sequence (Application 40 to 49).

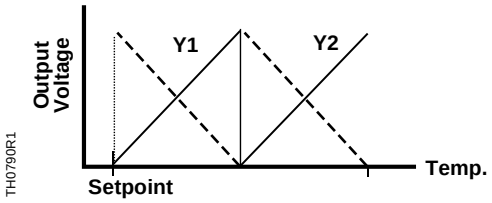


Figure 6. Two Direct Acting Cool or Two Reverse Acting Cool Sequences (Application 50 to 59).

Universal Input X1

The primary input for a Siemens Ni 1000 temperature sensor, a Pt 1000 temperature sensor, or a 0 to 10 Vdc active input.

Universal Input X2

The secondary input for a Siemens Ni 1000 temperature sensor, a Pt 1000 temperature sensor, an active/passive remote setpoint transmitter, or a 0 to 10 Vdc active input.

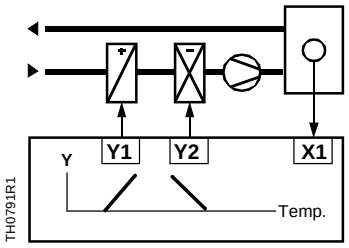
Digital Input D1

Selects the day/night changeover. Changeover occurs via potential-free dry contacts between D1 and M. Typically, a time clock controls D1 input.

Analog Outputs

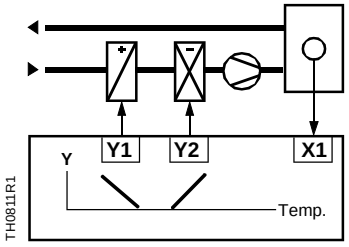
Each output (Y1, Y2) can be configured for either reverse or direct acting. The modulating voltage output (Y…) controls the devices requiring a 0 to 10 Vdc signal.

Example



X1 Room temperature
Y1 Heating, direct action
Y2 Cooling, reverse action

Figure 7. Constant Volume with Temperature Control, Direct Acting/Reverse Acting.



X1 Room temperature
Y1 Heating, reverse action
Y2 Cooling, direct action

Figure 8. Constant Volume with Temperature Control, Reverse Acting/Direct Acting.

Auxiliary Functions

One of the following auxiliary functions can be selected:

- P+I limiter (Absolute, #x2 and Relative, #x3)
- Remote setpoint, #x1
- Cascade control, #x5
- Setpoint reset, #x4
- Winter/summer operation, Digital #x6, Analog #x7
- Maximum priority, #x8
- Main loop 0 to 10V input, #x9

Day and night operation mode is also available.

P+I Limiter Function

NOTE: In the following illustrations, the heating and cooling outputs are D.A. Outputs can be reversed.

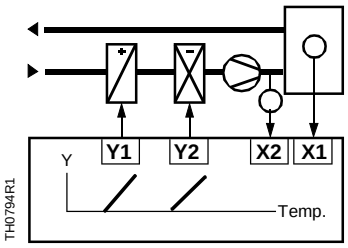


Figure 9. P+I Limiter Function.

The limiter function with P+I control enables absolute (or relative) maximum or minimum limitation of the supply air temperature (X2).

When the value drops below or exceeds the limiter setpoint, the limiter function controls and takes priority over the main setpoint.

Remote Setpoint

NOTE: You cannot select the remote setpoint auxiliary function in Night mode.

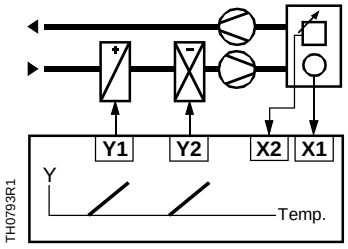


Figure 10. Remote Setpoint.

A remote setpoint transmitter (QAA25U), connected to X2 and configured accordingly, enables setpoint adjustment.

Active measurement from 0 to 10 Vdc corresponding adjustable range from –100 to 8000 units

Passive measurement from 0 to 1000 Ω corresponding adjustable range from –100 to 8000 units

Cascade Control

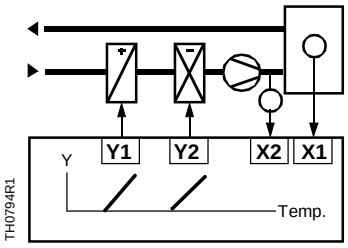


Figure 11. X2 Supply Air Temperature Sensor.

You can select the P+I/P+I room/supply air temperature cascade control. In this case, the virtual P+I room temperature controller determines the setpoint within the limiter setpoints for the P+I supply air temperature controller.

Maximum Priority

NOTE: You cannot select the maximum priority auxiliary function in Night mode.

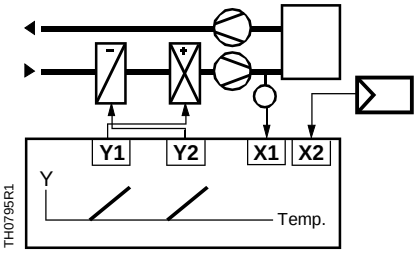


Figure 12. Maximum Priority, Cooling.

If the value (0 to 10V) of the input X2 is greater than the calculated output of the cooling sequence, the output will use the X2 input value as output value. This is active even when the controller is working with the heating sequence.

Setpoint Reset

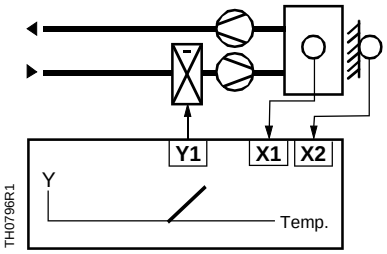


Figure 13. Setpoint Reset.

The temperature setpoint X1 is shifted by the temperature as measured at sensor X2.

Configuration of the RWD62U defines the influence on setpoint X1.

The example shows the room air temperature setpoint as shifted by the outside temperature.

Winter/Summer Operation

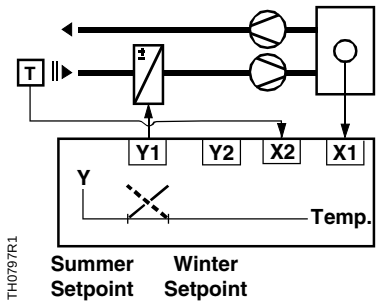


Figure 14. Winter/Summer Operation.

A digital switch or analog input between terminals X2 and M will implement winter/summer changeover.

When adjusting setpoints, the heating setpoint must be less than the cooling setpoint.

Digital changeover
When the contact is closed, summer operation is selected. Reverse acting output (Y1 only) is set to direct action (cooling).

Analog changeover
Summer operation is selected when the X2 input exceeds the setpoint Reverse acting output (Y1 only) is set to direct action (cooling).

Day/Night Setpoint

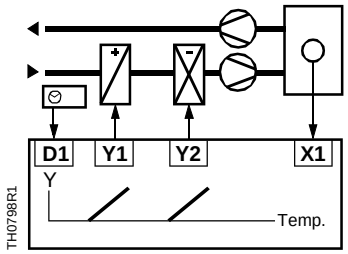


Figure 15. Day/Night Setpoint.

A contact between terminals D1 and M can be used to implement setpoint changeover for day/night operation.

When the contact is open, the setpoints for day operation are selected.

When the contact is closed, the setpoints for night operation are selected.

During the night mode, the following auxiliary functions are disabled: remote setpoint, absolute/relative limiter, setpoint reset and maximum priority.

Mechanical Design

Protective Housing ARG62.21

- This UL-approved plastic housing protects the controller when mounted outside a control panel, such as on ducts, walls and in mechanical rooms. This housing also prevents inadvertent contact with voltage supplying parts such as the connecting terminals.
- The RWD62U clips into the housing.
- The cable entries are located at the top and the bottom of the ARG62.21 housing.
- The front has an opening for the LCD display and the programming buttons.

Terminals

Plug-in screw terminals

Operating and Display Elements

The RWD62U is operated by the buttons on the controller front. Additional tools are not necessary. The controller can also be programmed via the software tool, which plugs into the nine-pin port.

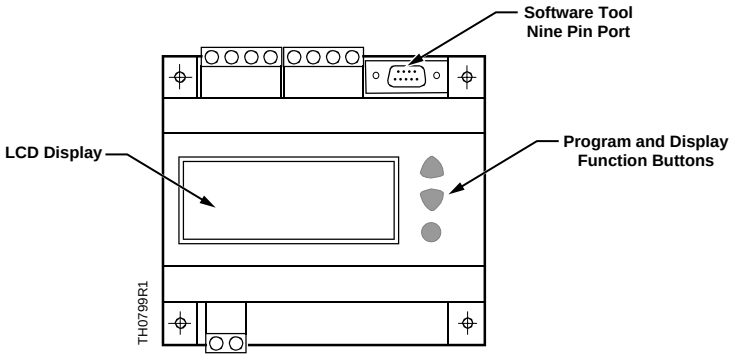


Figure 16. RWD62U Universal Controller.

LCD

The LCD shows the following information for normal operation:

- Current operating values (maximum four digits)
- Current setpoints (day/night)
- Application number
- Control sequencing diagram
- Auxiliary input value
- Selected auxiliary function

Operating Buttons

The controller has three operating buttons for the following functions:

The SELECT ● button is used to enter or save the value adjustment.

The ▲▼ operating buttons are used for viewing and adjusting parameters.

Configuration

To configure the controller, follow the instructions supplied with the controller.

Installation Notes

The RWD62U controller can be mounted as follows:

NOTE: Observe all local installation regulations and building codes.

A On a DIN rail at least 4.7 inches (120 mm) long

B Wall-mounted with two #6 screws

C Front-mounted using standard hardware:
- One DIN rail 5.9 inches (150 mm) long
- Two hexagonal blocks 1.97 inches (50 mm)
- Washers and screws

D In the ARG62.21 protective housing

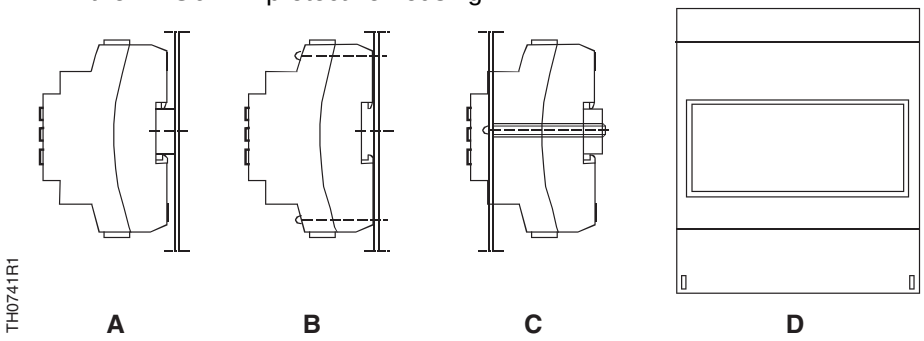


Figure 17. Mounting Options.

Electrical Installation Notes

CAUTION:

- Standard cables can be used for the controller. However, when mounting in an environment greatly exposed to Electrical Magnetic Interface (EMI), use only shielded cables.
- The RWD62U is designed for 24 Vac operating voltage.
- Use safety insulating transformers with double insulation; they must be designed for 100% duty.
- When using several transformers in one system, the connection terminals G0 (ground) must be galvanically connected.
- Supplying voltages above 24 Vac to low voltage connections may damage or destroy the controller or any other connected devices.
- Connections to voltages exceeding 24 Vac endanger personal safety.
- The ARG62.21 Protective Housing does not provide grounding between conduit connections. Use grounding bushings and jumper wires or equivalent.

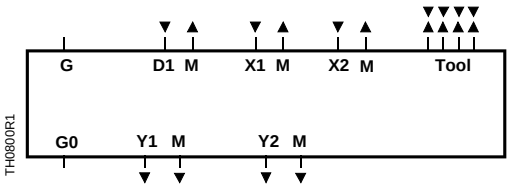
Commissioning Notes

A commissioning booklet is included with the RWD62U controller.

Observe the following:

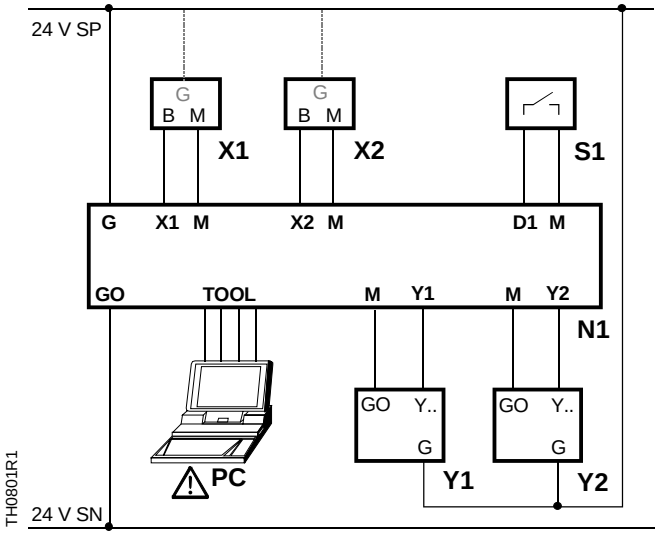
- The controller must be configured for application-specific operation using the standard application number.
- Application-specific fine tuning can be performed if required (see the *commissioning booklet*).
- Power supply to the controller and the connected devices must be guaranteed.
- Values and settings entered remain available even on power failure.

Wiring Diagrams



D1	Digital input
G, G0	24 Vac supply
M	Ground (G0) for signal inputs and universal inputs and analog outputs
X1	Signal input (main input: Siemens Ni 1000, Pt 1000 and 0 to10 Vdc)
X2	Signal input (aux. Input: Siemens Ni1000, Pt 1000, 0 to10 Vdc and 0 to 1000 Ω or 0 to 10 Vdc remote setpoint)
Y1, Y2	Analog outputs
Tool	Communication port for PC (9-pin plug)

Figure 18. RWD62U Wiring Diagram.



N1	RWD62U controller
PC	Personal computer
S1	Time clock or switch
SN	System neutral
SP	System potential
X1	Main input (Termination G appears when X1 is an active sensor)
X2	Auxiliary input or remote setpoint (Termination G appears when X2 is an active sensor)
Y1, Y2	Valve actuator 1 and 2/Damper actuator 1 and 2

Figure 19. Connection Diagram.

CAUTION:

if you use a DESKTOP computer, the TOOL signal ground is galvanically connected to G0 inside the controller. If the signal line of the computer is grounded to Earth, the G0 line after TOOL connection will be grounded as well.

Dimensions

In Inches (Millimeters)

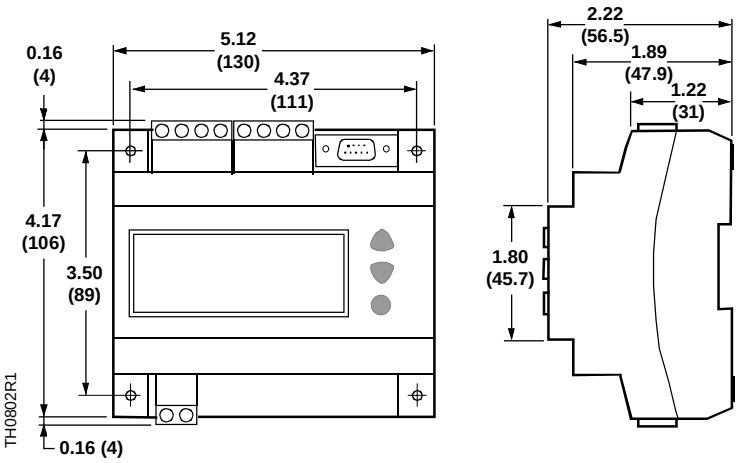


Figure 20. RWD62U Controller Dimensions.

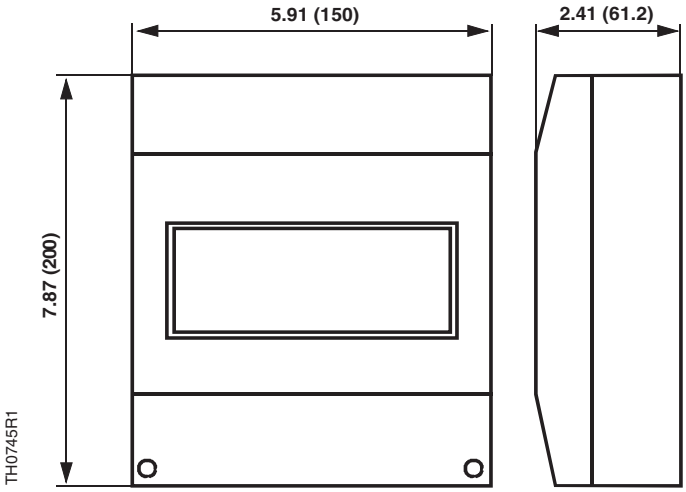


Figure 21. ARG62.21 Enclosure Dimensions.