RCS

Model TR40
Rev P

Communicating Thermostat
With RS485 Serial Communications

QUICK START GUIDE

This quick start guide provides basic connection information.

The CD included with this product contains the following documentation and programs:

- **TR40 Installation and Operations Manual**
- **Serial Communications Protocol Manual**
- **Thermostat Control Program (TCP)**
- **TCP Users Manual**

Read these documents before attempting to install or use this product and before calling for technical support.

Additional information may be available at the RCS website: www.resconsys.com

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TR40 Thermostat kit contents:

1. TS40 Wall Display Unit (WDU)
2. TR40 HVAC Control Unit
3. TR40 Quick Start Guide
4. Installation CD

Installation

1. Read the Installation Manual on the CD.

2. Perform the BENCH TEST It is **HIGHLY RECOMMENDED** that the thermostat be BENCH TESTED before it is installed on the wall. Setup and connect the WDU and Control Unit, following the wiring guide, wiring diagram and setup instructions, with a short (1-3 ft) piece of 4 conductor wire (any wire, 22ga or larger, cat 3/5 or thermostat wire will do for this test).

Connect a source of 24VAC power to the control unit. (from the HVAC system or a separate transformer)

DO NOT connect the other HVAC system thermostat wires at this time (G, W1/W2 or Y1/Y2).

Double check the wiring connections. Caution! mis-wiring the WDU to Control unit can damage the WDU.

Power up the unit and observe the WDU screen. Following the initial startup screens, the main thermostat screen will be displayed. This should show the room temperature, setpoints and other thermostat displays.

Observe the HVAC control unit. The Status LED should be flashing slowly.

If "ComFailure" appears in the top center of the WDU screen it indicates that the WDU and Control Unit cannot communicate with each other. Double check your wiring connections on the WDU and Control unit. Do not proceed until the wiring is corrected.

Press the fan mode button on the WDU. The Fan mode should change from "Auto" to "On" in the WDU screen and the "G" (fan) LED on the control unit should come on. Press the fan button again to set the fan mode to "Auto" and the "G" LED should go off. .

These tests verify the WDU and Control Unit power up operation and communications between them.

It is advised that you take the time, while the system is on the "bench", to familiarize yourself with the WDU screens and thermostat operations. Refer to the Operations manual on the CD for complete thermostat information.

3. Set the Network Address

Set the thermostat network address (default address: 1) using the Installer Settings screen on the TS40 WDU. This hidden screen is accessed from the Menu screen by pressing and holding the two inner buttons on the WDU for 5 seconds. See the operations manual for details.

4. RS485 Communications Test

You can test the thermostat RS485 communications using a PC and the RCS Thermostat Control Program (TCP) if you are using the RCS RS232/RS485 converter. See the TCP manual.

If you are connecting to another RS485 network, it is recommended that you establish network communications during this Bench Test. It is much easier to troubleshoot network connections with both the WDU and Control Unit together on the bench.

The Bench Test is complete! Proceed with actual thermostat installation and connect the remaining wiring to the HVAC system.

TR40 Control Unit Wiring Guide

Wall Display Unit Connection (J1)

The WDU to Control Unit wiring is typically Cat3/5 22/24 Ga twisted pair wiring (recommended) or thermostat wire (18/20 Ga).

Caution: Miswiring the WDU to Control unit connections may result in damage to the WDU. This is NOT covered under the warranty.

24VAC Power to the Control Unit (J3)

There are two power options for the control unit:

- **Power from the HVAC system's transformer.** Wire the 24V common (typically the blue wire) to the 24C connection on the controller power terminal. Wire the 24V return (red wire) to the 24R connection on the 24VAC power terminal. For typical HVAC systems (without split RC and RH transformers) you can use the unused RH connection to jumper the 24R to the power terminal.

- **Power from an external power transformer**. Connect an external 24VAC, 20VA transformer to the power terminals. Do NOT connect any external power connects to the HVAC System terminals 24RH or 24RC.

HVAC System Connection (J4)

Determine the HVAC System type, Standard Gas/Electric or Heat Pump. Refer to the specific HVAC system type wiring diagram in the Installation Manual. Use typical 18/20 thermostat wire. G refers to the Fan output, W is the Heat output and Y is the Cool (compressor) output. The O terminal (W2/O) is used for the changeover valve output for Heat Pump HVAC systems. The G, W ,Y and O refer to the standard thermostat wire color codes, Green, White, Yellow and Orange. W2 and Y2 are for second stage outputs used with two stage heating and/or cooling systems.

Transformer Connections 24RH and 24RC

Single Transformer HVAC Systems

Most central HVAC systems have a common heating and cooling system transformer. This is the default configuration of the Control Unit's HVAC Systems 24RH and 24RC terminals and they are connected together. 24R wiring from the HVAC system can be connected to either the RH or RC terminals.

Separate Heating and Cooling Transformer HVAC Systems

If the Heating/Cooling system has separate heating and cooling transformers, you MUST cut the jumper JP1 on the control board. Connect the cooling system transformer to RC and the heating system transformer to RH.

NOTE: With separate transformer systems, the Fan (G) terminal is connected to the RH transformer. If the Fan (G) output needs to be connected to the RC transformer, you must use an external relay to do so.

RS485 Network Connection (J2)

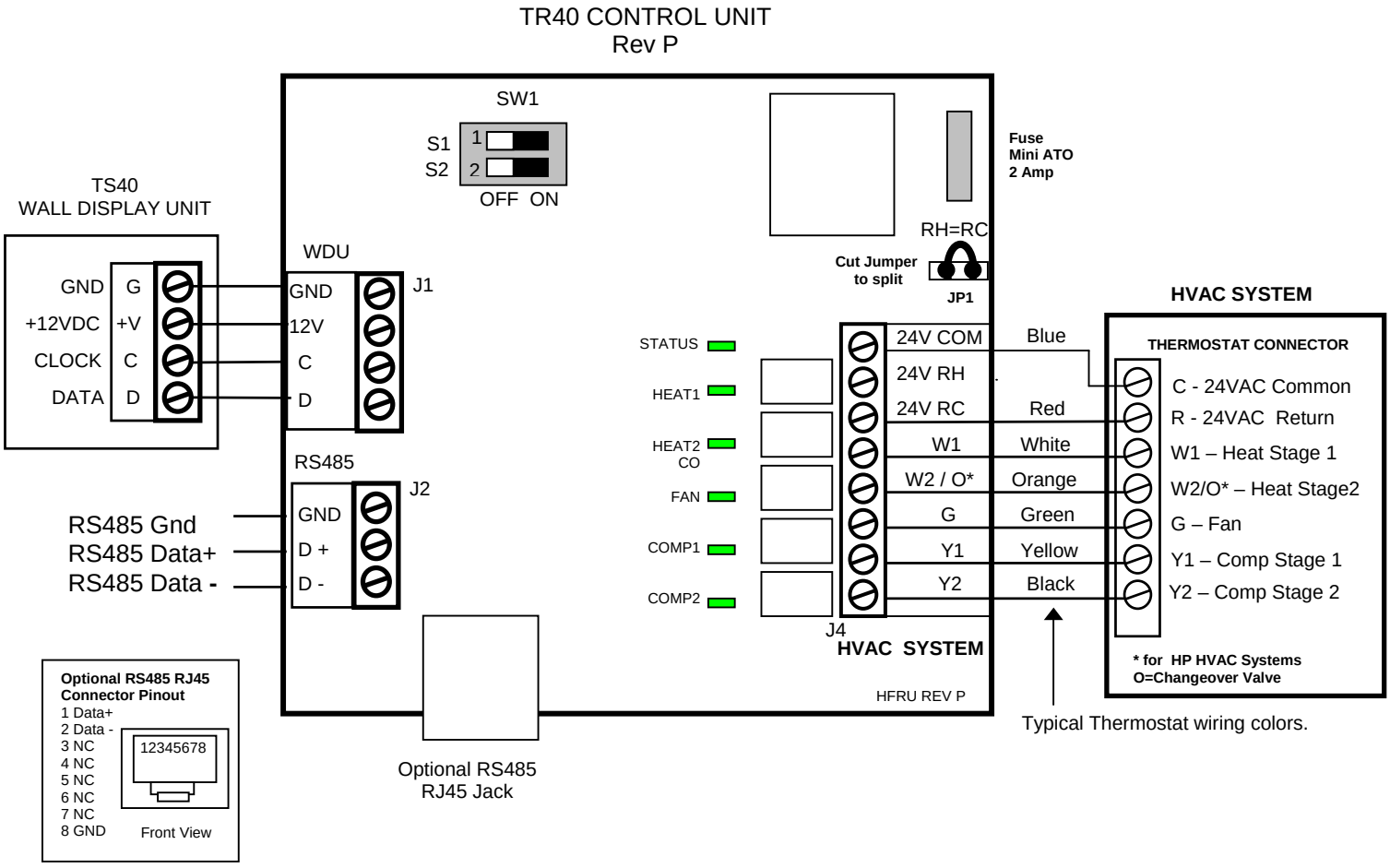
Connect the RS485 network connections to J2. Typical RS485 wiring is label as Data+ and Data -, or Data B and Data A. For RCS networks wire Data B/+ to Data B/+ and Data A/- to Data A/-. If the RS485 network does not connect, try reversing the lines. The RS485 ground wire is recommended.

Set Dipswitch SW1

Set Dipswitch SW1 on the thermostat HVAC Control Unit for the correct HVAC system type, Standard Gas/Electric or Heat Pump. Also set the Fan type for Standard systems or the Changeover Valve type for Heat Pumps systems.

IMPORTANT: SW1 MUST be set to the correct HVAC type for proper HVAC system operation!

TR40 Wiring Diagram



HVAC System Transformer:

Most central HVAC systems have a common heating and cooling transformer. This is the factory default setting for Jumper JP1. In some cases, you may have separate heating and cooling systems, each with their own transformer. In that case, cut Jumper JP1 and wire the heating transformer red wire to the RH terminal and the cooling system transformer red wire to the RC terminal. Wire the cooling system's 24VAC Com to the control unit's 24VAC Com terminal.

Dipswitch SW1 Settings: (White is switch position)

SW1-S1, STANDARD OR HEAT PUMP SYSTEM SELECTION

HVAC Systems can be either Standard Gas/Electric systems or Heat Pump systems.
Set S1 to OFF for Gas/Electric systems (default setting).
Set S1 to ON for Heat Pump systems

SW1-S2 Fan or Change Over Valve Selection

If S1 is set to Off for Standard HVAC systems, then S2 selects the HVAC ***fan type***.
Set S2 to OFF for gas systems that do not require Fan w/heat calls.(default setting)
Set S2 to ON for electric systems.

If S1 is set to On for HP HVAC systems, then S2 selects the ***changeover or reversing valve type.***
Set S2 to OFF for changeover with cooling (default setting).
Set S2 to ON for changeover with heating