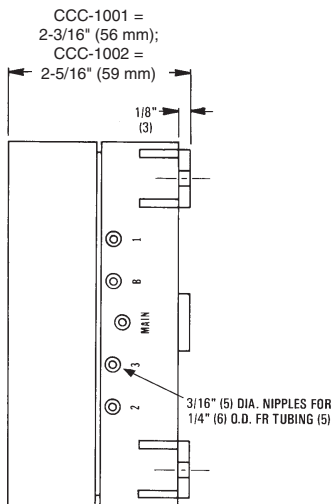
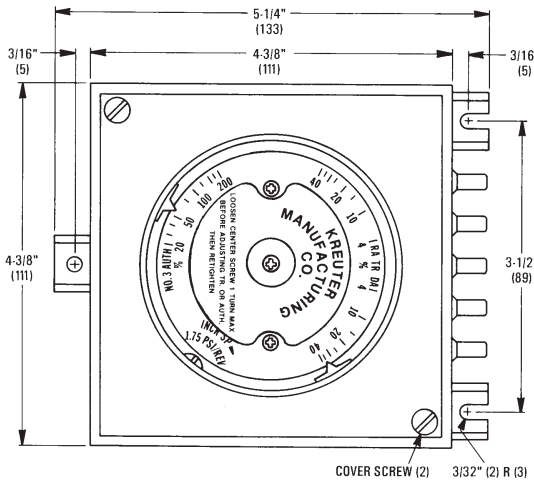


Installation Guide

Mounting

The CCC-1001 and CCC-1002 are not position sensitive, but they must be calibrated and mounted in the same orientation.

1. Locate the three mounting ears (flanges) on the unit.
2. Place the controller on the mounting surface and mark the locations of the two top ears.
3. Partially install two mounting screws (#8 or #10) on the marks. These should be 3-1/2" (89 mm) apart.
4. Slide the top ears under the screws.
5. Install the third mounting screw in the bottom ear and tighten all three screws.



CCC-1001 Shown

Connections

The units are supplied as Direct Acting (DA). **If Reverse Acting (RA) is required:**

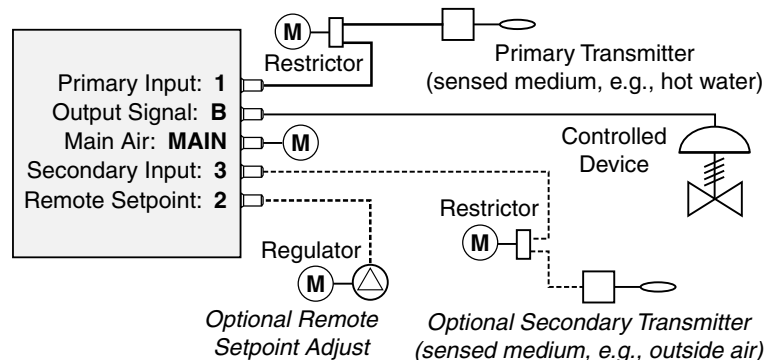
1. Locate the tubing connections on the back of the controller.
2. Cut the branch tubing at the DA connection (lower right corner).
3. Remove tubing from the two-prong guides.
4. Connect branch tubing to the RA connection (upper right corner) using brass fittings (provided).
5. Secure extra tubing in the two-prong guides.

A CCC-1001/1002 controller has five 3/16" (5 mm) ports to accept 1/4" (6 mm) O.D. polyethylene tubing. **Connect the controller to other units as follows:**

1. Main control air to Port M. This should be 20 psig (137 kPa), 30 psig (207 kPa) max.
2. Primary input, 3–15 psig, to Port 1.
3. Remote setpoint adjustment, 3–15 psig with a +/- 10% offset, to Port 2.
4. Secondary input to Port 3.

CAUTION

Pneumatic devices must be supplied with clean, dry control air. Any other medium (e.g., oil or moisture contamination) will cause the device to fail.



Adjustments and Calibration

CCC-1001 Controller

NOTE: **Throttling range** is the percent change of the primary input (Port 1) that causes a 100% change in the branch output (Port B). **Authority** is the change in the secondary input (Port 3) in relation to the change in the primary input that will cause the same change in the output and is expressed as a percentage (see the Authority Calibration section).

1. Remove cover before making any adjustments.
2. Set the desired throttling range:
 - A. Loosen large center screw (1 turn maximum).
 - B. Remove main control air from Port M.
 - C. Move the setpoint indicator to the desired % throttling range (4 to 40%) on the DA or RA scale. **See the Throttling Range Adjustment section on page 3.**
 - D. Connect main air to "M."
3. Set the desired authority:
 - A. Calculate the required authority. **See the Authority Calibration section.**
 - B. Set the authority indicator to the desired value.
 - C. Tighten center screw.
4. Adjust the setpoint output by turning the setpoint screw (located at the lower right of the unit). **See the Setpoint Calibration section on page 3.**
5. Reinstall the cover.

CCC-1002 Controller

NOTE: Follow the steps **1 through 4 for adjusting the CCC-1001**, and then continue with steps 5 through 8.

5. Turn the face dial until the desired input signal (Port 1) pressure value lines up with the clear arrow indicator.
6. Carefully slide the cover straight down, so that the cover gear teeth and the setpoint adjustment shaft mesh.
7. Tighten the cover.
8. Apply the adhesive dial face if required.

Throttling Range Adjustment

Throttling range % can be calculated by the following formula:

$$\frac{\text{Port 1 Units Desired to Make 100\% Change in Port B (Output)}}{\text{Port 1 Primary Input Span (Same Units as Above)}} \times \frac{12}{\text{Span of Controlled Device (psi)}} \times 100$$

Example: Port 1 is connected to a temperature transmitter with a range of 40 to 240° F (200° F span). Branch output is controlling a 3 to 8 psi (5 psi span) device. Desired throttling range is 20° F. Then throttling range % = (20° F)/(200° F) x (12 psi)/(5 psi) x 100 = 24%.

Authority Calibration

This adjustment determines the effect of a secondary transmitter (Port 3) on the setpoint of the receiver-controller.

Example: Reset the HWS (Hot Water Supply) temperature setpoint based on OAT (Outside Air Temperature). The HWS transmitter has a range of 40 to 240° F for 3 to 15 psi (0.06 psi/° F), and it is connected to the Port 1 primary input. The OAT transmitter has a range of -40 to 160° F for 3 to 15 psi (0.06 psi/° F), and it is connected to the Port 3 secondary input.

NOTE: This example does not compensate for TR (throttling range) across the reset schedule but assumes a constant branch pressure.

The reset schedule shows the temperatures and pressures at the extreme ends of the operating schedule.

Reset Schedule			
OAT Port #3 Pressure	Outside Air Temperature	Hot Water Temperature	HWS Port #1 Pressure
5.4 psi	0° F	180° F	11.4 psi
7.5 psi	35° F	140° F	9.0 psi
9.6 psi	70° F	100° F	6.6 psi

Authority % =

$$\frac{\Delta P @ \text{Port 1}}{\Delta P @ \text{Port 3}} \times 100\% = \frac{11.4 - 6.6}{9.6 - 5.4} \times 100\% = 114\%$$

(Δ P = Change in Pressure)

(In the Example Above)

Setpoint Calibration

Initial setpoint calibration is done after the spring tube on the back of the controller has been properly connected and secured and the throttling range and authority adjustments have been set and locked.

1. Make the following connections:
 - A. Main air supply (20 psi) to MAIN.
 - B. Branch (output) gauge to Port B.
 - C. For **SINGLE** input operation, connect pressure to Port 1 equal to the desired setpoint, **OR** for **DUAL** input operation, connect pressures to Ports 1 and 3 that correspond to the reset schedule at approximately midrange.
 - D. If the remote setpoint adjustment is to be used, connect pressure to Port 2 that corresponds to zero offset.
 - E. Unused inputs are left unconnected.
2. Turn the setpoint adjustment screw to obtain an output equal to the midrange pressure of the controlled device.
 - A. If in the DA mode and branch pressure is high, turn the setpoint screw CW; if branch pressure is low, turn the setpoint screw CCW.
 - B. If in the RA mode and branch pressure is high, turn the setpoint screw CCW; if branch pressure is low, turn the setpoint screw CW.

After the system is live, minor adjustments to the setpoint calibration can easily be done if the setpoint offset is known. Each complete clockwise rotation, of the screw, is equivalent to a 1.75 psi increase in Port 1 pressure. To increase the setpoint, turn the adjustment screw CW; to decrease the setpoint, turn the adjustment screw CCW. The number of turns equals:

$$\frac{\text{Setpoint Offset (° F)}}{\text{Port 1 Primary Input Span (° F)}} \times \frac{\text{Port 1 Primary Input Span (psi)}}{1.75}$$

Example: Port 1 is connected to a temperature transmitter with a range of 40 to 240° F (200° F span) and an output of 3 to 15 psi (12 psi span). The desired control point is 7° F higher than the actual control point. Then, the number of turns = (7°)/(200°) x (12 psi)/1.75 = 0.24. Thus, the set point adjustment screw should be turned 1/4 of a turn CW.

Remote Setpoint Adjustment

An input pressure change of 3 to 15 psi to Port 2 will change the setpoint 20% of the span of the primary transmitter. The effect of the change is direct in nature. An increase in Port 2 pressure from 9 to 15 psi increases the setpoint 10% and a decrease in Port 2 pressure from 9 to 3 psi decreases the setpoint 10%.

Example: If the Port 1 transmitter has a range of 40 to 240° F (200° F span), then the remote setpoint adjustment pressure on Port 2 can change the setpoint +/- 20° F or a total of 40° F or 20% of the Port 1 primary input span.

Accessories

External restrictor HFO-0022 (Restrictor T, 28.8 scim) might be required if replacing a receiver/controller using internal restrictors. All transmitters used with the CCC-1001/1002 require an external restrictor.

For other pneumatic accessories, such as connectors, tubing, fittings, filters, and gauges, see the Compressed Air Accessories section in the Electronic and Pneumatic Controls Condensed Catalog (SP-071).

Maintenance

No routine maintenance is required. Each component is designed and manufactured for reliability and performance. Careful installation will ensure long term dependability.

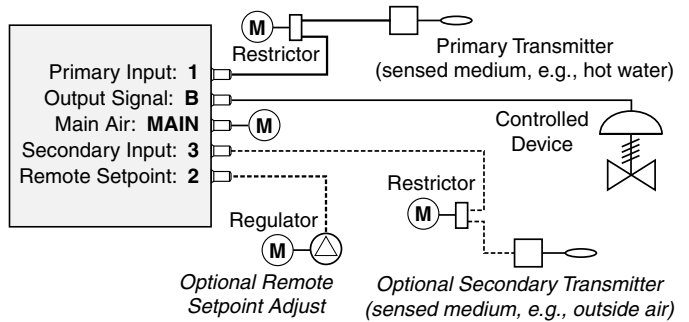
Competitor Cross-Reference

The CCC-1002 can replace many competitor single/dual-input receiver/controllers such as:

- Barber-Colman (Schneider Electric) RKS-1001/2001/3002/4002
- Honeywell RP908A/RP908B/RP920A/RP920B
- Johnson T-9000 and T-5801/5802
- Robertshaw (Schneider Electric) P341 and 2341
- Siemens 185 and 195 series

A cross-reference of corresponding piping for some of these controllers is shown in the chart below.

NOTE: External restrictor HFO-0022 might be required if replacing a receiver/controller using internal restrictors.



Ports	KMC	Barber-Colman	Honeywell		Johnson	Robertshaw		Siemens
	CCC-1002	RKS	RP908	RP920	T-5800	P341	P541	195
Main Air	MAIN	M	M	1	S	M	M	S
Output Signal	B	B-c	B	2	O	B	B	C
Primary Input	1	1	1	3	CV	1	S	1 or 2
Secondary Input	3	2	2	5	M	3	R	1 or 2
Remote Setpoint	2	RSPA	CPA	9	SP	2	C	3

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