## KOOLANCE **CTR-CD1224 User Manual** v 1.0

The rear of the unit accepts various connections to integrate with your cooling system. The temperature sensors may come pre-connected. If not, connect them per the diagram below:

Pump Voltage Jumper: Configure the pump output for a maximum of 12-Volts or 24-Volts. Misconfiguration could damage the pump!

Shutdown Relay: Configure the safety shutdown relay (labeled "ATX") as Normally-Open (NO) or Normally-Closed (NC).
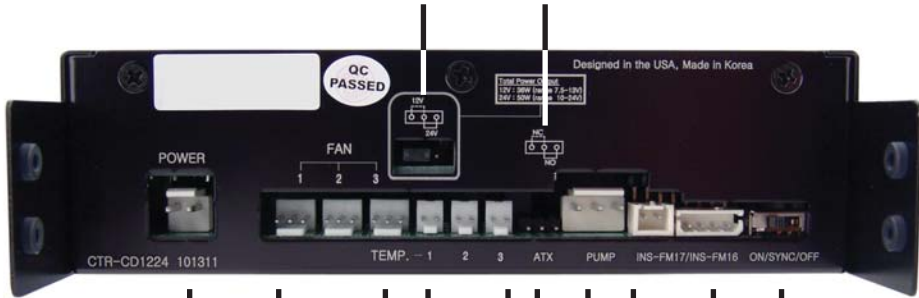
POWER: Connection from power supply, 12VDC

FAN: Radiator fan connections (2.0A max per plug, 4.5A total)

TEMP: Temperature sensors shown on the front display

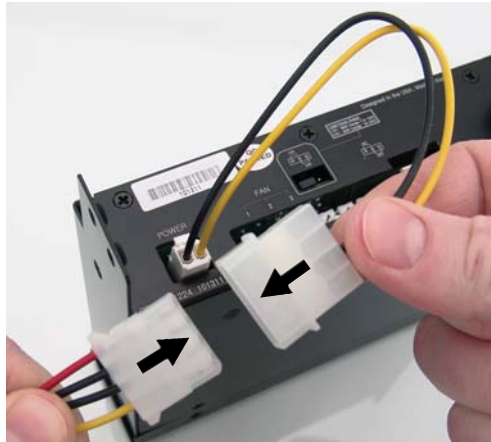**ATX**: Lead for power shut-down feature

PUMP: External pump

INS-FM17/INS-FM16: Connect an optional flow meter to display flow rate

ON/SYNC/OFF: Adjusts LED lighting of INS-FM16 flow meter

Power Connection

Plug the included power harness into the location on the rear of the unit marked "Power". To this, connect a 12 Volt 4-pin Molex plug from your power supply.
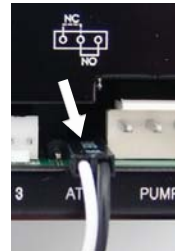

Fan Connection

This unit has three connections to power radiator fans. Multiple fans can be combined into a single plug. (A fan wiring harness is optionally available from Koolance).

⚠ **CAUTION:** The total combined amperage of all fans connected to the unit can not exceed 4.5A. The maximum load on a single fan header is 2.0A.

ATX Shutdown Relay

The ATX lead is responsible for sending the shutdown signal if any sensor reaches the preset temperature (detailed later). This can be configured as NC (normally closed) or NO (normally open) by attaching the two-pin wire to the corresponding pins. For computers, use "NO" (normally open).

There is no polarity orientation with the ATX lead. For computer use, connect the male shutdown lead from the Koolance unit to your computer's front chassis power button.

To Motherboard

From Koolance Unit

Chassis Power Button
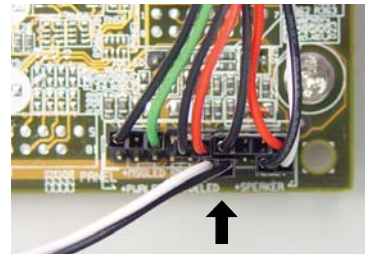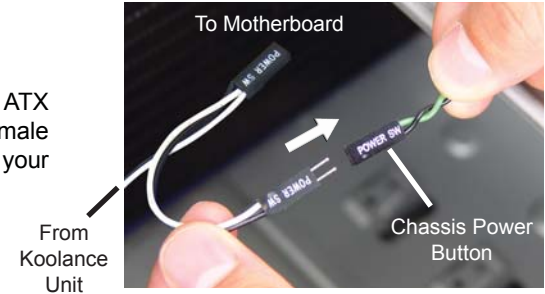
Connect the female ATX lead to the motherboard's power switch connection (usually marked "PWR", "PWRSW", "PWSW", or "PWBT"). This is the connection that would normally receive the chassis power button directly.

Pump Connection and Voltage Jumper

Plug the included pump wiring harness into the rear "Pump" connector. Different plugs are provided to connect a single 12 Volt or 24 Volt DC pump. (Max. output power = 36W @12V, 50W @24V.) Do not connect more than one pump.
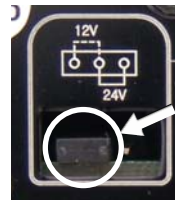
The pump voltage jumper should be set for the maximum voltage capability of the pump, either 12V or 24V.
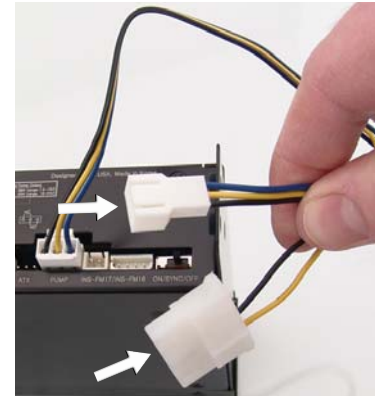
⚠ **CAUTION:** Do not power 12V pumps at the 24V setting! This can permanently damage the pump.
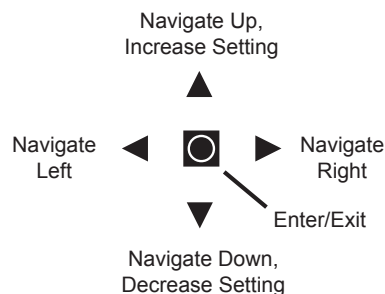
Flow Meter Connection

The cooling system can show values for one Koolance flow meter (sold separately). Connect a flow meter to the appropriately labeled plug. (Note: INS-FM18 and INS-FM19 should connect to the plug labeled "INS-FM17".)

CAUTION: This product allows full user control of hardware safety settings, such as audio alarm, shutdown, and pump speed. Please be sure to configure your Display Panel properly, or damage to your computer, data, and/or equipment could result.

The Koolance display panel allows control and monitoring of various aspects of a cooling system. 5 buttons are used, with directional arrows to navigate or change settings, and a center button to enter/exit.

Navigate Up,
Increase Setting
▲

Navigate Left ◄ ◉ ► Navigate Right

Enter/Exit

▼

Navigate Down,
Decrease Setting

• On the main screen, hold ◉ for 3 seconds to change display units between °C/°F and LPM/GPM.
• You can exit any menu and return to the main screen by holding ◉ for 2 seconds.
• To reset **ALL** settings to default, hold ▼ + ▲ for 5 seconds.

Main Menu

To enter the main menu, briefly press ◉. The selected option will begin flashing. Use ▼ and ▲ to navigate this menu.

```
▲   TEMP SET:  Temperature, alarm, and shutdown settings
    FAN SET:  Fan settings
    PUMP SET:  Pump settings
    FLOW SET:  Flow meter settings
▼   DISPLAY SET:  Display settings
```

When in the top menu, press ◉ to enter one of the above categories. To exit from here, press ◄.

TEMP SET

The temperature menu allows configuration of the alarm and safety shutdown options. This cooling system can monitor up to 3 (included) temperature sensors. An audio alarm will sound if any sensor reaches its set alarm point. The offending sensor will also flash in the display, and the radiator fans and pump will increase to 100% power. If any sensor reaches its set shutdown point, the system will signal shutdown with a relay through the "ATX" wire.

```
▲   TEMP1    55C    56C :  Sensor #1, Alarm Point, Shutdown Point
    TEMP2    51C    54C :  Sensor #2, Alarm Point, Shutdown Point
▼   TEMP3    60C    70C :  Sensor #3, Alarm Point, Shutdown Point
```

When in the "Temperature Settings" menu, the selected temperature sensor will flash. Press ▼ and ▲ to navigate, or press ◉ to select a sensor to configure:

```
TEMP1    SET
AL: 55C   PW: 56C :  AL = Alarm, PW = Power (Shutdown)
```

The alarm value will flash. Press ▼ or ▲ to adjust a value. Press ◉ to change to the shutdown temperature. Press ◉ again to exit configuration of this sensor. Press ◄ to return to the previous menu.

NOTE: The shutdown temperature must be at least 1ºC (1-2ºF) higher than the alarm temperature. If an alarm temperature can not be increased, increase the shutdown temperature first. The minimum and maximum temperature range allowable is 0-99ºC (32-210ºF).

CAUTION: Generally, sensors report liquid temperature at the water block, which is typically 5-10°C (9-18°F) lower than the actual heat source. This difference must be considered if adjusting alarm/shutdown temperatures. Setting alarm/shutdown modes at too high of temperature can eliminate this feature's effectiveness. The default Koolance settings are designed to help compensate for temperature differences of a typical computer CPU/GPU water block.

FAN SET

This unit has three fan channels which can be independently adjusted. Alternatively, use the master fan channel ("ALL FANS") to adjust all fan channels simultaneously.

```
▲   ALL FANS    50% :  All Fans (Master), Speed Setting %
    FAN1 SET    84% :  Fan Channel #1, Speed Setting %
    FAN2 SET    47% :  Fan Channel #2, Speed Setting %
▼   FAN3 SET    30% :  Fan Channel #3, Speed Setting %
```

The selected fan channel will flash. Press ▼ and ▲ to navigate, press ◄ to return to the previous menu, or press ◉ to configure this fan channel:

```
ALL FANS    50%
```

The speed value will flash. Press ▼ or ▲ to adjust this value. Press ◉ to confirm the setting.

Higher fan speeds can improve performance, but will produce more noise. Fan speeds can be adjusted manually from 0-100%.

CAUTION: Fan percentages are based on PWM duty. Fans will not operate if set too low. Some types of fans may not be compatible with the PWM program and will only operate reliably at 100%.

Instead of manual speeds, fans can also be set to automatic. This is highly recommended, since speeds will change based on temperature sensor feedback. This is a good way to keep noise levels to a minimum while allowing the cooling system to respond to temperature. To set a fan channel to automatic, press ▲ past 100% until "AUTO" is shown:

```
ALL FANS      AUTO
```

From here, press ◎ to configure the automatic mode:

```
ALL FANS      AUTO
T1  L45C      H80C :  Temp Sensor, Low Point, High Point
```

The number following "T" designates the temperature sensor this fan channel will follow. When flashing, press ▼ or ▲ to change sensors (1-3). Press ◎ to move to the next option.

The number following "L" is the temperature low point. The number following "H" is the temperature high point. Automatic fan control will adjust fans on a dynamic ramp between these two points:

```
100% 
        Automatic Fan
           Power

 20%

            45°C            80°C
         (Low Point)    (High Point)
```
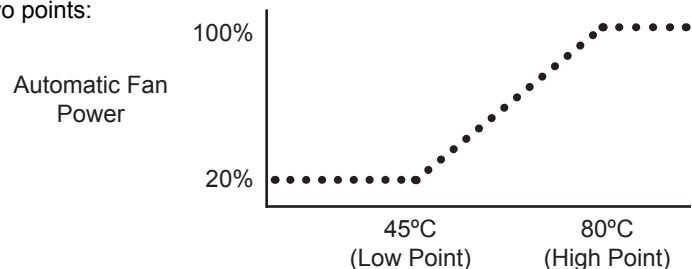
When the temperature low point is flashing, press ▼ or ▲ to adjust it. Press ◎ to move to the temperature high point, and press ▼ or ▲ to adjust it. Press ◎ again to return to the previous menu.

PUMP SET

The pump speed can be manually set from 1-10:

```
PUMP(1-10)    7LV :  Pump Speed Level
```

The pump speed level will flash. Press ▼ or ▲ to adjust. Press ◎ to return to the previous menu.

FLOW SET

If a Koolance flow meter (sold separately) has been connected to the unit, configuration is needed to properly display its values. Only one flow meter can be displayed by the cooling system.

```
FLOW METER SET
FM-17      ID: 10mm :  Flow Meter Model, Tubing Internal Diameter
```

The Koolance flow meter model number (SKU) will flash. Press ▼ or ▲ to adjust this based on the following:

- INS-FM16: change to "FM-16"
- INS-FM17, INS-FM17N, INS-FM18, INS-FM19: change to "FM-17"

Press ◎ to move to the next option. The tubing internal diameter (ID) size will flash. This refers to the hose size attached to the flow meter itself. Press ▼ or ▲ to adjust this based on the following:

- 6mm (1/4 inch): change to "ID: 6mm"
- 10mm (3/8 inch): change to "ID: 10mm"
- 13mm (1/2 inch): change to "ID: 13mm"

Press ◎ to return to the previous menu.

DISPLAY SET

The display settings configure which values you wish to appear on the front display and how they are shown:

```
DISPLAY
FIXED         CYCLIC :  Show 2 values or cycle multiple values
```

The first option, "FIXED", will flash. Press ◄ or ► to change between these options. Press ◎ to configure one of the selections, or press ▲ to exit. If "FIXED" is selected, two lines will be shown:

```
TEMP1   21.7C :  First line display option
TEMP1   21.7C :  Second line display option
```

The first line will flash. Press ▼ or ▲ to change what this line will display:

```
TEMP1   21.7C :  Show temperature sensor #1
TEMP2   21.2C :  Show temperature sensor #2
TEMP3   20.8C :  Show temperature sensor #3
FAN1     1770RPM :  Show fan channel #1
FAN2     1640RPM :  Show fan channel #2
FAN3     1820RPM :  Show fan channel #3
PUMP     5730RPM :  Show pump speed
FLOW     4.1LPM:  Show flow rate
```

Press ◎ to confirm. The second line will flash. Press ▼ or ▲ to adjust this line.
Press ◄ to return to the previous menu, or press ◎ to return to the main screen.

When "FIXED" is the chosen display option, line 1 and 2 can be changed quickly without reentering the DISPLAY SET menu. To do this, briefly press ▲ from the main screen. The first line will flash:

```
TEMP1   21.7C :  First line display option
PUMP   5400RPM :  Second line display option
```

Press ▼ or ▲ to change what this line will display among the options described earlier. Press ◉ to move to line 2, and similarly use ▼ or ▲. Press ◉ again to exit.

If "CYCLIC" is chosen from the DISPLAY SET menu, multiple values will be rotated through the front display. The first option is whether these values will cycle vertically or horizontally through the display:

```
CYCLIC
VERT      HORI:  Scroll values vertically or horizontally
```

The first option, "VERT", will flash. Press ◄ or ► to change between these options, press ◉ to configure a selection, or press ▲ to exit. Choosing either option with ◉ will list all available values:

```
*TEMP1    21.7C :  Show temperature sensor #1
*TEMP2    21.2C :  Show temperature sensor #2
*TEMP3    20.8C :  Show temperature sensor #3
*FAN1      1770RPM :  Show fan channel #1
*FAN2      1640RPM :  Show fan channel #2
*FAN3      1820RPM :  Show fan channel #3
*PUMP      5730RPM :  Show pump speed
*FLOW       4.1LPM:  Show flow rate
```

The selected line will flash. Use ▼ and ▲ to navigate to other lines. Press ◉ to enable or disable each value. This will remove the asterisk, thereby hiding that line from being shown on the main screen:

```
*TEMP1    21.7C :  (shown)
*TEMP2    21.2C :  (shown)
 TEMP3    20.8C :  (not shown)
*FAN1      1770RPM :  (shown)
 FAN2      1640RPM :  (not shown)
 FAN3      1820RPM :  (not shown)
*PUMP      5730RPM :  (shown)
*FLOW       4.1LPM:  (shown)
```

Press ◄ to return to the previous menu, or press ► to exit DISPLAY SET.

Temperature Sensor Placement

Three surface temperature sensors are included with this product for monitoring. Generally, sensors are affixed to water blocks with metal tape. (Liquid temperature sensors are also available optionally from Koolance.)

Sensors should never be placed directly between a heat source and its water block. This will interfere with contact and can damage the sensor or heat source.

Chip contact area (keep out)
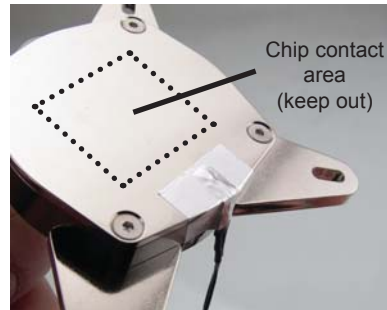
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