NOAH PRECISION, LLC

Remote Communication Module

Model RCMe

January 2007

User Manual

User Manual

RCMe
Remote Communication Module

NOAH PRECISION, LLC

A message to our customers:

Originally founded in 1985, our Company has grown into a recognized leader in providing temperature control systems to the global semiconductor industry.

Today, Noah Precision, LLC is a privately held, employee owned and managed company. We are guided in our belief that prosperity in this competitive industry stems from providing customers with highly engineered new products and world class customer service.

We know that great products are often the result of great customer feedback and the application of innovative technology. We strive to create value for our customers through a process that lets the customer influence our goals, objectives, product developments and business practices.

We embrace personal accountability and accept responsibility for prudent risk taking. We encourage personal values, which guide us to consistently meet the commitments we make and we endeavor to treat those with whom we interact with respect as we wish to be treated ourselves.

Sincerely,

Peter Adams, President
Noah Precision, LLC

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The information contained in this manual is subject to change by Noah Precision, LLC without prior notice. Noah Precision, LLC makes no warranty of any kind whatsoever, either expressed or implied, with respect to the information contained herein. Noah Precision, LLC shall not be liable in damages, of whatever kind, as a result of the reliance on or use of the information contained herein.

PRODUCT USAGE STATEMENT

DANGER:

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or maintaining this equipment. Practice all plant and product safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. All personnel who work with or who are exposed to this equipment must take precautions to protect themselves against serious or possibly fatal bodily injury.

Noah Precision, LLC, provides information on its products and associated hazards, but it assumes no responsibility for the after-sale operation of the equipment or the safety practices of the owner or user. This equipment produces or uses potentially lethal high-voltage, high-current, electrical power. NEVER DEFEAT INTERLOCKS OR GROUNDS.

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CUSTOMER FEEDBACK

Noah Precision's technical writing staff has carefully developed this manual using research-based document design principles. However, improvement is ongoing, and the writing staff welcomes and appreciates customer feedback. Please send any comments on the content, organization, or format of this user manual to

- tech.writing@noahprecision.com

To order a manual, please contact Noah Precision (see "Customer Support Locations" on page 4-1 for contact information).

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Chapter 1 - Introduction

READ THIS SECTION!

To ensure safe operation, read and understand this manual before attempting to install or operate this unit.

INTERPRETING THE MANUAL

The following sections explain the icons, and symbols that appear in this manual.

Icons (Symbols)

This symbol represents important notes concerning potential harm to people, this unit, or associated equipment.

Noah Precision® includes this symbol in Danger, Warning, and Caution boxes to identify specific levels of hazard seriousness:

DANGER:
This box identifies hazards or unsafe practices that could result in severe personal injury or death.

WARNING:
This box identifies hazards or unsafe practices that could result in personal injury.

CAUTION:
This box identifies hazards or unsafe practices that could result in product or property damage.

The following symbols may appear on labels on the unit.

High voltage

CE label

NRTL (Nationally Recognized Testing Laboratory)

SAFETY

Do not attempt to install or operate this equipment without proper training.

- Ensure that this unit is properly grounded.
- Ensure that all cables are properly connected.
- Verify that input line voltage and current capacity are within specifications before turning on the power supplies.
- Use proper electrostatic discharge (ESD) precautions.
- BE CAREFUL AROUND THIS EQUIPMENT.

PRODUCT SAFETY/COMPLIANCE

Certain options of this product will be tested for and comply with Electromagnetic Compatibility (EMC) standards.

Certification

Certain options of this product are pending certification by:

- Canadian Standards Association (CSA) (NRTL/C)
- CE certification
- EMC measurements
- SEMI S2

For more information, refer to the letter of conformance (US) or declaration of conformity (EU) accompanying the product.

Installation Requirements

Install this unit according to the following requirements.

DANGER:
Operating and maintenance personnel must receive proper training before installing, troubleshooting, or maintaining high-energy electrical equipment. Potentially lethal voltages could cause death, serious personal injury, or damage to the equipment. Ensure that all appropriate safety precautions are taken.

Conditions of Use

To be in compliance with the stated directives and standards, the following conditions of use must be met.

- Install and operate this device in an over voltage category II installation only.
- Use only shielded cables for RS-485 communications.

RCMe EXPLAINED

The RCMe (Remote Communication Module) allows for easy connection of the Noah chiller unit to either a LonWorks™ or DeviceNet™ network. The latest Lam tools have all standardized on LonWorks™ while the latest AMAT tools have all standardized on DeviceNet™.

The RCMe connects between the Noah's Power Supply Controllers (4400, 8800 and PSCe) and the AMAT or LAM tool's network. This compact device requires only two connections when used with the PSCe. A DB9 cable provides communication to and from the PSCe, as well as providing DC power for the RCMe. The other connection is to the network - J5 and J6 are RJ-45 jacks that provide a "daisy chain" connecting scheme to LonWorks, or J4 is used to tap into a DeviceNet network when the unit is selected for DeviceNet. When connected to the PSC 4400 or 8800, a third connection is required to power the RCMe in the form of an external 12-24 VDC power supply.

The RCMe complies with the LonMark™ standard for trouble-free compatibility on the LonWorks™ network. Likewise, this is registered with ODVA to ensure compliance on the DeviceNet™ network (future provision).

The RCMe has all the switches, connectors, labeling, status LEDs, and functionality as required by the ODVA and LonMark associations. These are all specified and described in this document.

Front View of RCMe

Figure 1-1. *Front view of the RCMe*

Front and Rear Panel LEDs, Switches & Connectors

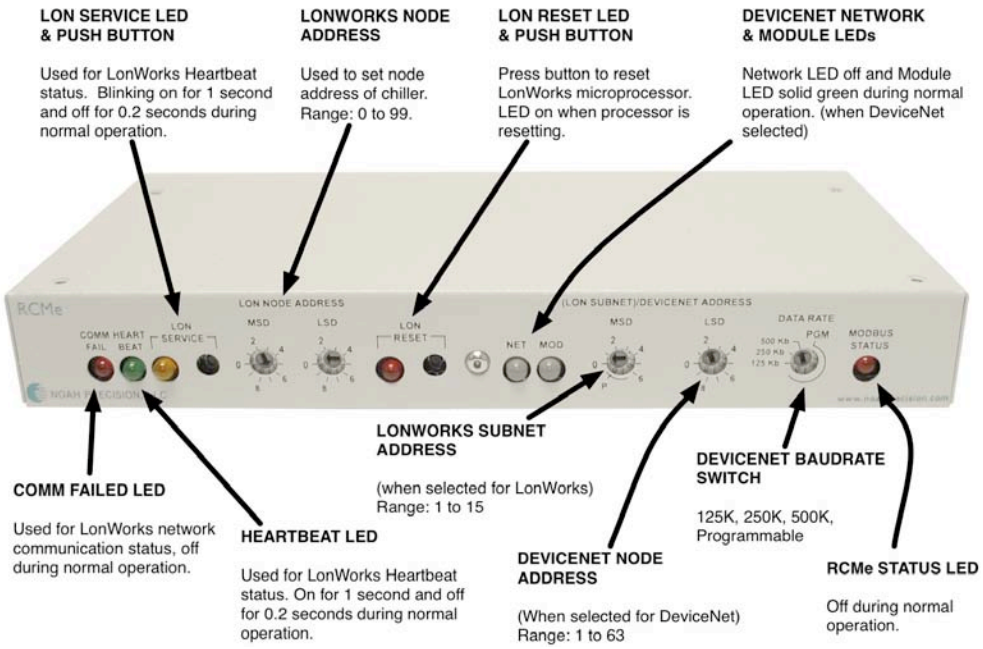


Figure 1-2. *Front view of the RCMe LED's & Switches*

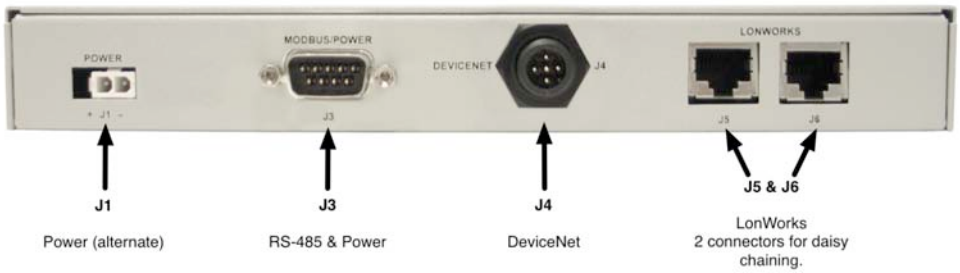


Figure 1-3. *Rear view of the RCMe Connectors*

Chapter 2 - Specifications

RCMe SPECIFICATIONS

Physical Specifications

Figure 2-1 has a dimensional photo for the RMCe followed by a table of its physical specifications as shown in Table 2-1.

Table 2-1. *Physical dimensions of the RCMe*

Specification	Dimension
Width	8 3/8” (213 mm)
Depth	4 1/8” (105 mm)
Height	1 1/8” (29 mm)
Weight	< 4 lbs. (1.81 kgs)

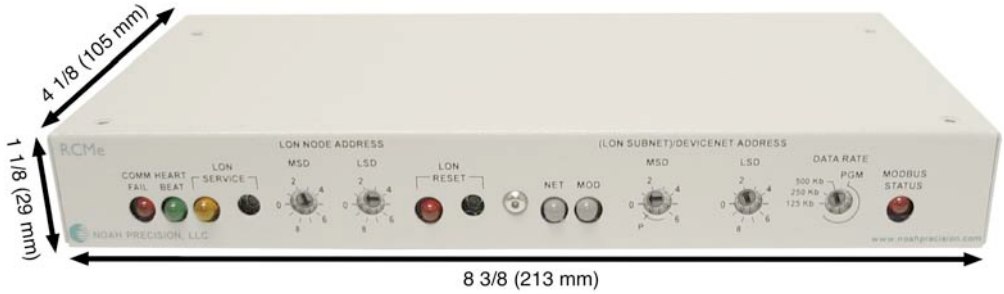


Figure 2-1. *Physical dimensions of the RCMe*

Temperature and Humidity Limits

Table 2-2 lists Temperature and Humidity limits for the RCMe.

Table 2-2. *Temperature and Humidity specification*

Specification	Description
Storage Temperature	-20 to +60 °C (-4 to +140 °F)
Operating Temperature	0 to +50 °C (+32 to +122 °F)
Humidity (maximum)	95 %
Environment	This product is intended for indoor use only

Operating Power Specification

Table 2-3 indicates the Operating Power Specification for the RCMe.

CAUTION:
Only authorized and qualified personnel should install or repair the RCMe.

Table 2-3. *Power Specifications of the RCMe*

Specification	Description
Voltage	+12 to +24 Vdc
Current (maximum)	250 mA
Power (maximum)	6 watts

Connectors Specification

Below are tables regarding connectors specification J1 through J6 for the rear panel of the RCMe.

Table 2-4. *Rear panel connector specification for J1*

Connector Name	Power
Connector Type	AMP 770966-1
'+' Terminal	+12 to +24 Vdc Input Power
'-' Terminal	Input Power Return
Other Specifications	250 mA (max)
Comments	• When the RCMe is connected to the PSCe then power is provided via the J3 • When the RCMe is connected to the PSC 4400 or 8800, then power must be provided externally via the J1 connector

Table 2-5. *Rear panel connector specification for J3*

Item	Power
Connector Type	DB-9, MALE
Pin 1	RXT -, EIA/TIA RS-485 Standard
Pin 5	Common, EIA/TIA RS-485 Standard
Pin 7	Power +, 12 to 24 Vdc, 250 mA (PSCe only)
Pin 8	Power -, power return (PSCe only)
Pin 9	RXT +, EIA/TIA RS-485 Standard

Table 2-6. *Rear panel connector specification for J4*

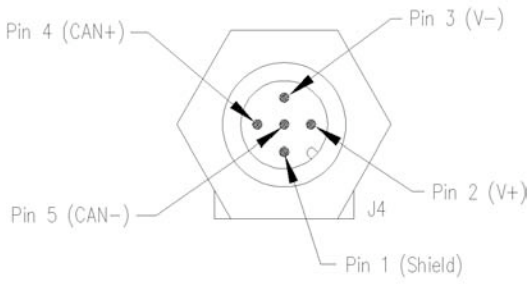
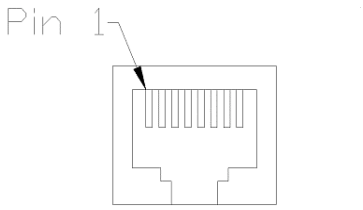
Item	Description
Connector Name	DeviceNet
Connector Type	SEMI SIG Micro Connector
Pin 1	V-, DeviceNet power return
Pin 2	CAN - , CAN transmission negative
Pin 3	Shield, CAN transmission shield
Pin 4	CAN + , CAN transmission positive
Pin 5	V+, DeviceNet Power
Pin Orientation	
Comments	Ref. ODVA, DeviceNet™ Specification

Table 2-7. *Rear panel connector specification for J5 and J6*

Item	Description
Connector Name	LonWorks™
Connector Type	RJ-45 , AMP 555153-1
Pin 1	Data-A
Pin 2	Data-B
Pin Orientation	
Comments	• all other pins not used • ref. LonMark association for further information

Modbus RTU Specifications

Table 2-8. *RCMe modbus RTU specification*

Item	Description
Physical Connection	J3 – 1, 5, 9
Physical Wires	2 wires, plus common
Baudrate	9600 bps
Data Bits	8 bits
Stop Bits	1 bit
Parity	None
PSC(e) Modbus Address	1 (default)
Comments	• The Modbus interface data current from the PSC or PSCe units. This is done via the J3 connector using a two-wire RS-485 interface. • PSC or PSCe must be selected for "RCMe" under Protocol, under the Global menu • If "Modbus Status" LED is blinking (at 1 hertz rate) this means serial communications is malfunctioning. check wiring and verify the PSC is set for "RCMe" in the Protocol settings under Global menu. • Maximum wiring length should be less than 10 meters (33 ft.)

LonWorks™ Details

The information in Table 2-9 provides low level network language intended for software engineers.

Table 2-9. *Network Variables*

INDX	NV NAME NVI Net Var. Input NVO Net Var. Output	PRIORITY	DIRECTION 1 NVO 0 NVI	SERVICE	AUTH.
0	Heartbeat (NVI)	0	0	0	0
1	Node Status (NVO)	0	1	0	0
2	Node Configuration (NVI)	0	0	0	0
3	Communication Reset (NVI)	0	0	0	0
4	Hardware Reset (NVI)	0	0	0	0
5	Node Information (NVO)	0	1	0	0
6	Node Configuration (NVI)	0	0	0	0
7	Chiller Control (NVI)	0	0	0	0
8	Chiller Configuration (NVI)	0	0	0	0
9	Chiller Data (NVO)	0	1	0	0

Chapter 3 - Operation

RCMe OPERATION ON A LONWORKS™ NETWORK

Follow the instructions below for basic step-by-step instructions for operating the RCMe on a LonWorks network. For support & troubleshooting information please refer to Chapter 4 "Troubleshooting".

Note: Refer to LonWorks Connection Block Diagram in Figure 3-3.

1. Securely mount the unit in close proximity (less than 10 meters) to the chiller power supply / controller unit.

2. Remove power from the PSC (4400 or 8800) or PSCe.

3. The unit must be internally configured for LonWorks™. Inside the enclosure (near the Modbus Status LED) are four dip switches. Verify that SW8-2 is in the "ON" position. This setting must be done prior to powering the unit on (see Figure 3-1 below).

4. Set the Node and Subnet address switches to the desired address. These addresses must be set prior to powering the unit on.

   Note: LAM2300 requires the chiller to have a subnet address of "02", and a node address of "70", (base 10 numbers).

5. Verify the chiller power supply / controller protocol is selected for "RCMe". This can be found under the Global Menu, under the protocol selection. For more information regarding this, see corresponding 3300/3500 manual listed under PSC.

6. Connect DB-9 cable (use cable with female gender on both ends) between the chiller power supply / controller (at the DB-9 connector) and the RCMe (at J3).

7. Connect LonWorks™ RJ-45 plugs into J5 and J6 (order is not important).

8. Apply power to the PSCe, thereby powering on the RCMe unit.

   Note: If RCMe is attached to a PSC, external power is required to J1.

9. Press the Lon Service button and verify the Lon Service LED flashes when the button is depressed. This causes the unit to broadcast a message of identity. The host tool may use this information to know that a new node is attached.

10. At this point the host tool needs to commission the node, meaning to allow it to transmit on the network. This entails the host tool to configure all the proper operating parameters (e.g. set point, control properties, limits, etc.) on the chiller power supply controller unit.

11. After the node has been commissioned, the LonWorks™ LEDs should match the specifications as shown in Table 3-1.

Table 3-1. *LonWorks™ LEDs during normal operation*

LED NAME	STATUS	NOTES
COMM LED	OFF	Means the node is commissioned by the host is healthy on the network.
HEARTBEAT LED	FLASHING (1 second ON, 0.2 seconds OFF)	Means the heartbeat is healthy.
LON SERVICE LED	OFF	
NET LED	OFF	Only used when unit is configured for DeviceNet.
MOD LED	OFF	Only used when unit is configured for DeviceNet.
MODBUS STATUS LED	OFF	Means healthy communications between RCMe and power supply / controller unit.

LonWorks & DeviceNet Switch Setting

The two dipswitch pairs (SW8 and SW9) are located on the printed circuit board near the *Modbus Status* LED

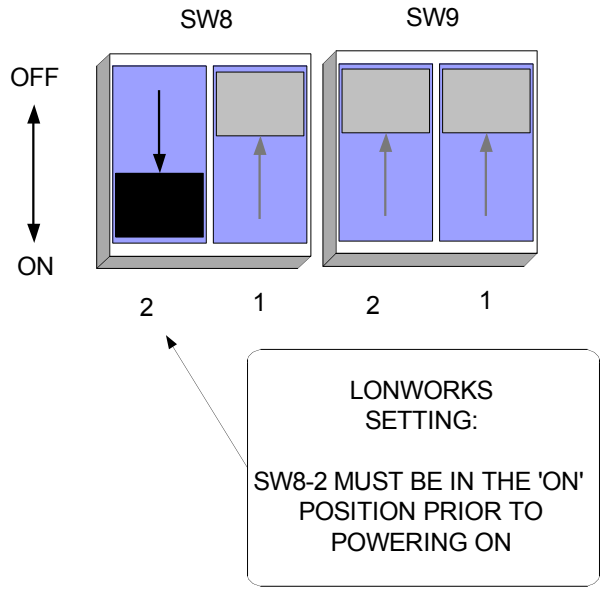


Figure 3-1. *LonWorks Switch Setting Diagram*

The two dipswitch pairs (SW8 and SW9) are located on the printed circuit board near the *Modbus Status* LED

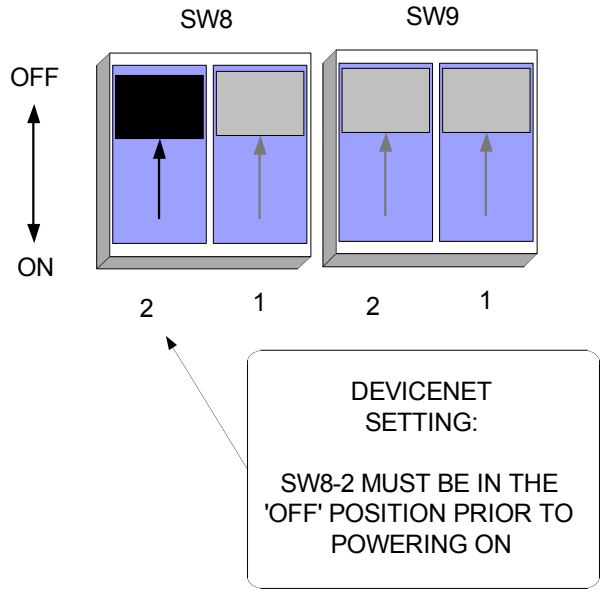


Figure 3-2. *DeviceNet Switch Setting Diagram*

LonWorks & DeviceNet Connection Blocks

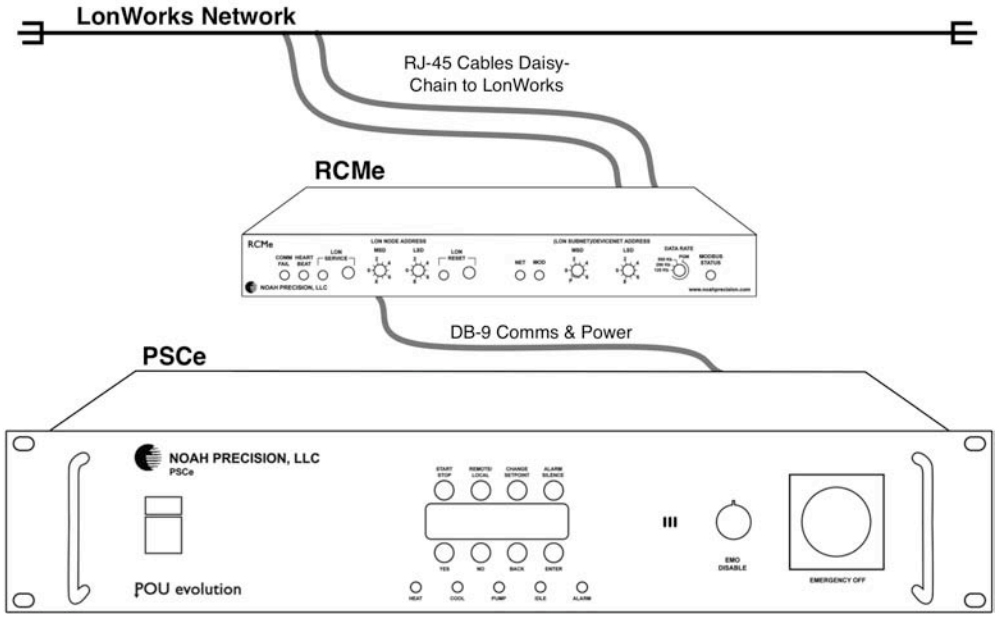


Figure 3-3. *LonWorks™ Connection Block Diagram*

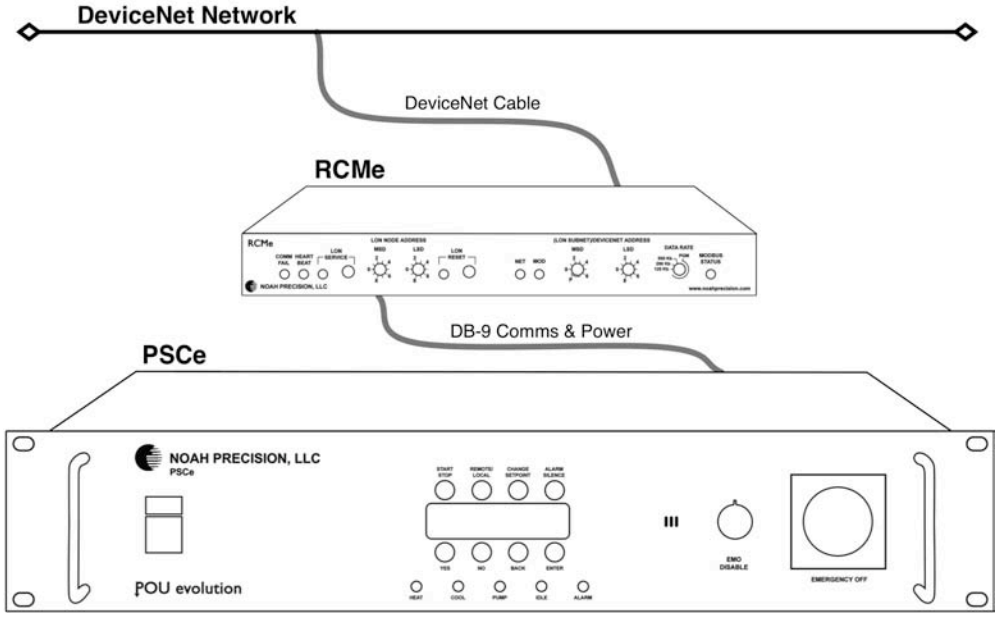


Figure 3-4. *DeviceNet™ Connection Block Diagram*

Note: Figures 3-3 and 3-4 are not to scale for illustration purposes only.

Chapter 4 - Troubleshooting

NOAH PRECISION CUSTOMER SUPPORT

Please contact one of the following offices in Table 4-1 for technical support.

Note: When calling Noah Precision Customer Support, make sure to have the unit serial number and part number. These numbers are available on unit labels.

Table 4-1. *Customer Support locations*

Office	Contact
Noah Precision, LLC 2501 SE Columbia Way Suite 140 Vancouver, WA 98661	Phone: +1 360 993 1395 Fax: +1 360 993 1399 Email: sales@noahprecision.com service@noahprecision.com Web: www.noahprecision.com
Teltec SA 224 Boulevard John Kennedy Batiment B1 - Room 401-403 91105 Corbeil-Essonnes FRANCE	Phone: +33 1 60 88 73 00 Fax: +33 1 64 96 44 03
Teltec SA Le Hameau du Parc - Batiment D Rousset Parc Club 13790 Rousset FRANCE	Phone: +33 4 42 53 23 82 Fax: +33 4 42 53 26 89
Teltec Gmbh Am Moosbach 6 74535 Mainhardt GERMANY	Phone: +49 7903 91 44-0 Fax: +49 7903 91 44-11
MCU Via Borgazzi, 13 Monza (MI) ITALY	Phone: +39 039 322351 Fax: +39 039 322351
Muramatsu Integrated Technology 102, 3-14-9, Aoki Kawaguchi-shi, Saitamaken 332-0031 JAPAN	Phone: +81 48 259 1203 Fax: +81 48 259 1203

Challentech No. 1, Lane 9, Pateh Road Hsin-Chu TAIWAN 300	Phone: +886 3 5614211 Fax: +886 3 5614210
APP Systems Services, PTE LTD 11 Toh Guan Road East #03-01 APP Enterprise Building Singapore 608603	Phone: +65 6425 6611 Fax: +65 6560 6616

Noah Precision World Wide Web Site

For additional product & support information, consult Noah Precision's World Wide Web site at:

http://www.noahprecision.com

TROUBLESHOOTING

This section discusses the following topics to help troubleshoot any problems that might occur when operating this unit. A troubleshooting guide is provided in Table 4-2. If following these procedures does not solve the problem, do not hesitate to call Noah Precision Customer Support.

Troubleshooting Guide

Table 4-2. *Troubleshooting*

Problem	Probable Cause	Corrective Action
When power is applied, all LEDs stay off, even after waiting 20 seconds.	When power is first applied there may not be communications to the power supply / controller. If this is the case then after 20 seconds the Modbus Status LED should start blinking at a 1 hertz rate, meaning Modbus communication failure (see below). If all LEDs stay off after 20 seconds then it would suggest the power is not adequate.	Check all wiring connection. Verify the power is within specification. Recycle the power. If using a PSC 4400/8800, verify that external power is supplied to the RCMe. Call the Factory if all attempts fail.
The Modbus Status LED is blinking at a 1 hertz rate.	The communication between the RCMe and chiller power supply / controller is failing.	Verify the protocol is selected to RCMe. Verify the communication address is set to 1. Verify the DB-9 cable is properly connected at both ends. Call the Factory if all attempts fail.
The Modbus Status LED is blinking at a 5 hertz rate.	The RCMe power has dropped below its safe operating level (~ 11 volts).	Verify supply power is within specification. Verify DB-9 cable is properly connected at both ends.

RETURNING UNITS FOR REPAIR

BEFORE returning any product for repair or adjustment, **follow all troubleshooting procedures**. If, after following these procedures, the problem still exists, or if the procedure instruction advises contacting Noah Precision Customer Support, call and discuss the problem with a representative. Be prepared to give the model number and serial number of the unit, as well as the reason for the proposed return. This consultation call allows Noah Precision Customer Support to determine whether the problem can be corrected in the field or if the unit must be returned. Such technical consultation is always free of charge.

If a unit is returned without first getting authorization from Noah Precision Customer Support and that unit is found to be functional, there is a re-test and calibration fee plus shipping charges.

To ensure years of dependable service, Noah Precision products are thoroughly tested and designed to be among the most reliable and highest quality systems available worldwide.

WARRANTY

Noah Precision, LLC products are warranted to be free from failures due to defects in material and workmanship after they are shipped from the factory (please see warranty statement below, for details) for the period of time defined in the purchase order.

To claim shipping or handling damage, inspect the delivered goods and report such damage to Noah Precision within 30 days of receipt of the goods. Please note that failing to report any damage within this period is the same as acknowledging that the goods were received undamaged.

For a warranty claim to be valid, it must:

- Be made within the applicable warranty period
- Include the product serial number and a full description of the circumstances giving rise to the claim
- Have been assigned return material authorization number (see below) by Noah Precision Customer Support

All warranty work will be performed at an authorized Noah Precision service center (see list of contacts at the beginning of this chapter). You are responsible for obtaining authorization (see details below) to return any defective units, prepaying the freight costs, and ensuring that the units are returned to an authorized Noah Precision service center. Noah Precision will return the repaired unit (freight prepaid) to you by second-day air shipment (or ground carrier for local returns); repair parts and labor will be provided free of charge. Whoever ships the unit (either you or Noah Precision) is responsible for properly packaging and adequately insuring the unit.

Authorized Returns

Before returning any product for repair and/or adjustment, call Noah Precision Customer Support and discuss the problem with them. Be prepared to give them the model number and serial number of the unit as well as the reason for the proposed return. This consultation call will allow Customer Support to determine if the unit must actually be returned for the problem to be corrected. Such technical consultation is always available at no charge.

Units that are returned without authorization from Noah Precision Customer Support and that are found to be functional will not be covered under the warranty (see warranty statement, below). That is, you will have to pay a retest and calibration fee, and all shipping charges.

Warranty Statement

The seller makes no express or implied warranty that the goods are merchantable or fit for any particular purpose except as specifically stated in printed Noah Precision specifications. The sole responsibility of the Seller shall be that it will manufacture the goods in accordance with its published specifications and that the goods will be free from defects in material and workmanship. The seller's liability for breach of an expressed warranty shall exist only if the goods are installed, started in operation, and tested in conformity with the seller's published instructions. The seller expressly excludes any warranty whatsoever concerning goods that have been subject to misuse, negligence, or accident, or that have been altered or repaired by anyone other than the seller or the seller's duly authorized agent. This warranty is expressly made in lieu of any and all other warranties, express or implied, unless otherwise agreed to in writing. The warranty period is defined in the purchase order and begins on the date the goods are shipped from Noah Precision. In all cases, the seller has sole responsibility for determining the cause and nature of the failure, and the seller's determination with regard thereto shall be final. The Noah Precision Warranty Statement may be superseded by a service agreement entered into between Noah Precision and the buyer.

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