MT-700 series installer guide

Supermarket Control Solutions

Installation and Operation Manual PUID 70-MTA-1017 R4.0 11221

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WARNING: Read this Manual before operation

Use this product only for its intended use as described in this manual. Do not use any other connection methods that are not recommended by the manufacturer.

Introduction

This manual is intended for the installer of the product. He or she must be a skilled technician with a minimum of installation knowlwdge with Micro Thermo or Echelon product.
The end user will never have to move, connect or disconnect physical part of the product.
The U700 is a monitoring industrial controller, one of the multiple combinaison of the new Micro Thermo Technologies MT-700 product family.
It is made of a main MT-722A Controller (A may be another letter) and a MT-716U (16 universal input) expension module.

U700 Installation

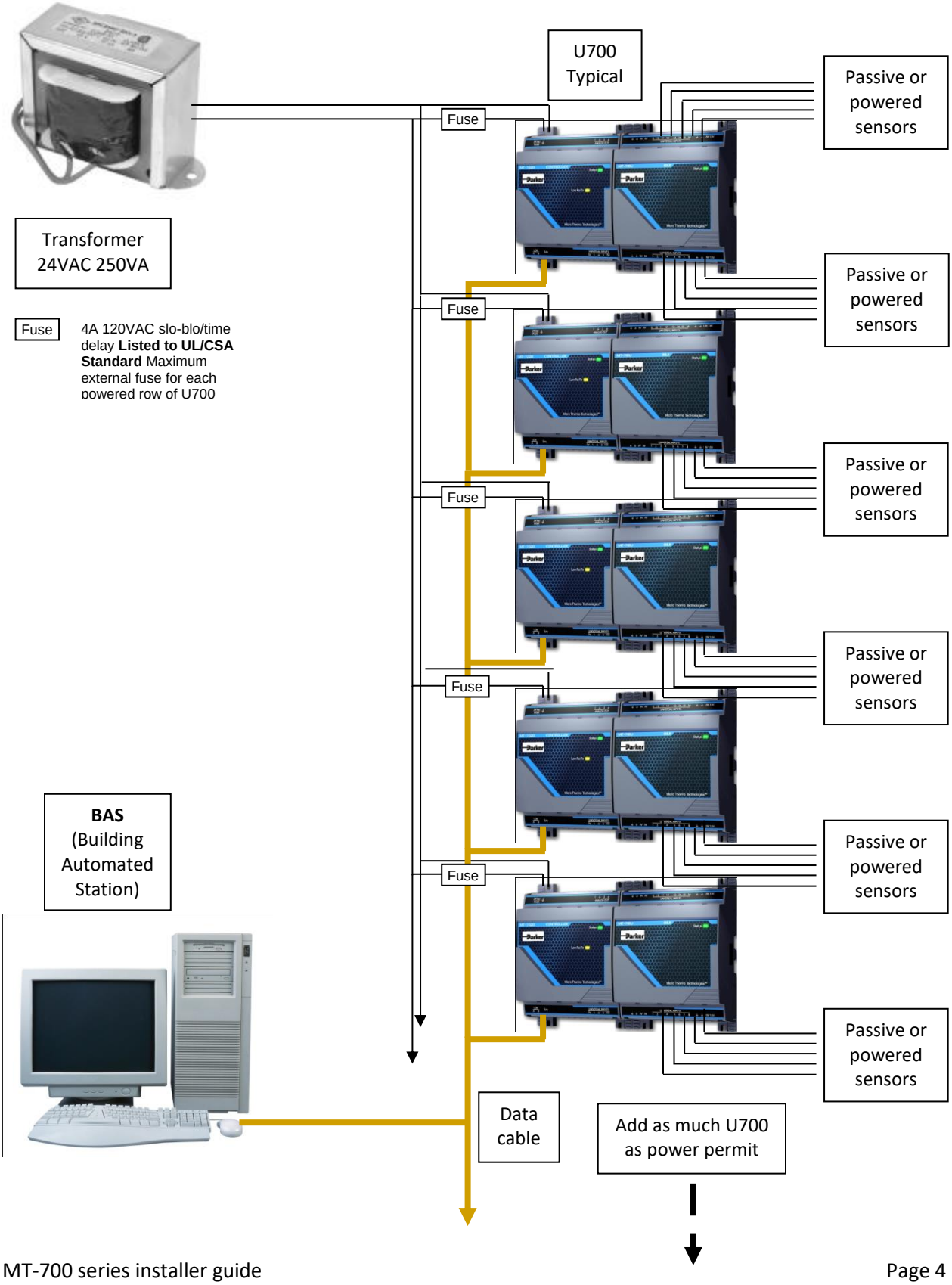
Mounting

The U700 Monitoring Node has two mounting options: DIN rail; or Direct Mounting by the eight screw holes (four per controller module).
For DIN rail mounting, mount the DIN rail in the desired location and attach the two controller modules to the rail separately. First install the MT-722A controller at the left end of the DIN rail. You may need to pull the locker up with a flat screw driver. Then put the MT-716U beside the Controller. Ensure the controllers' communication ports are correctly aligned, and gently slide the units together until the plastic housings are flush.

For Direct Mounting, mount the controller modules separately, remove all wire connectors before securing the MT-722A module in the left place using (4) #6 screws. Align the controllers' communication ports, and push the MT-716U units together until the plastic housings are flush. Secure the second module in place using (4) #6 screws. Replace wire connectors.

Any combinason of MT-700 modules can be made as long as only one MT-722A is used per row and placed at the left most of the row. **If the MT-722A is loaded with a battery cell or if any relay of a of MT-700 module is used to control voltage higher than 24V the entire row should be housed in an electrical enclosure.**

Typical U700 installation



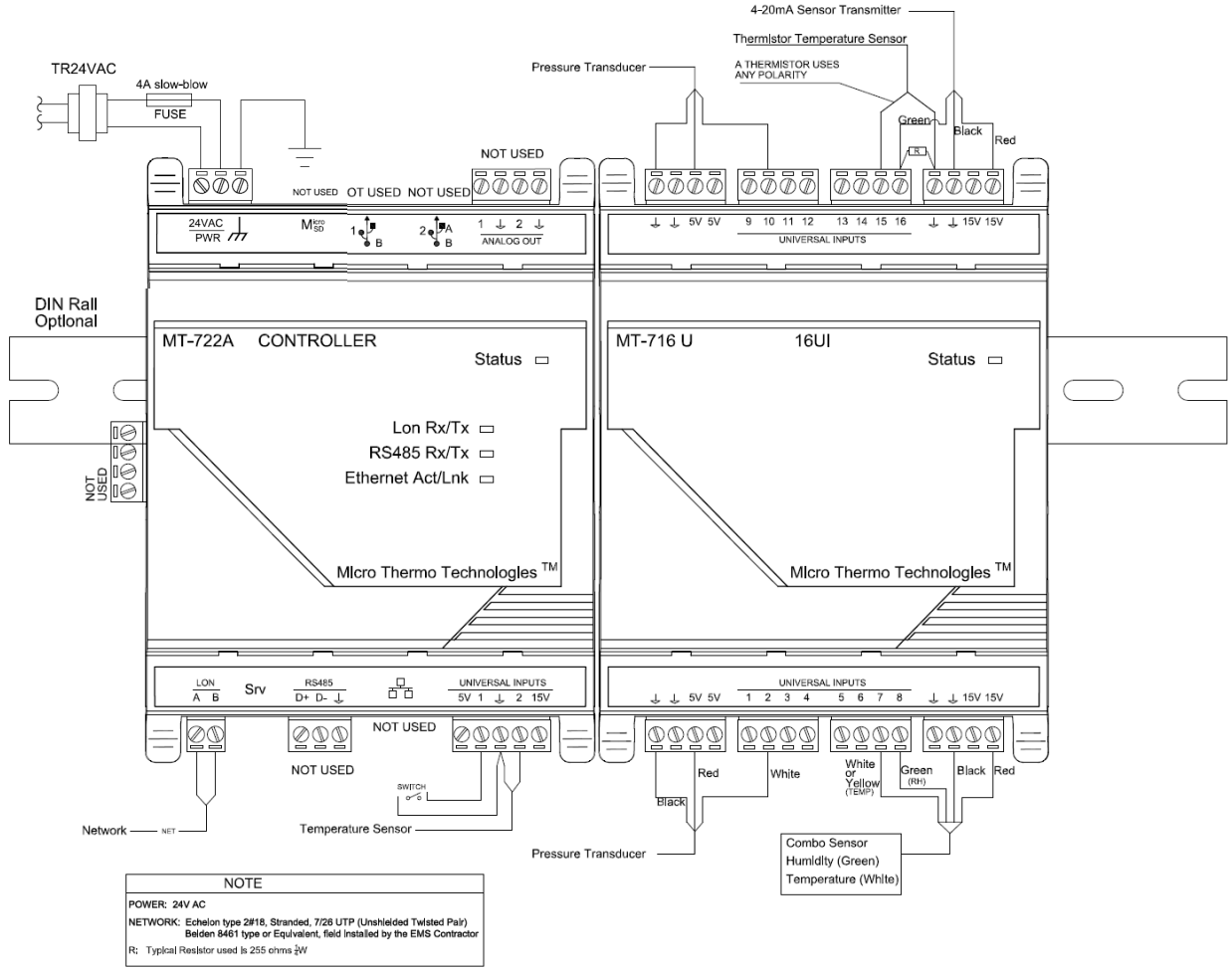
Wiring

IMPORTANT: All input connections / signals shall be isolated from a double insulated source

For proper operation, the U700 Monitoring Node requires the power supply and LonWorks® network be connected. Up to (18) sensors can be connected for monitoring and alarming. Refer to *Appendix I – Filed Wring* and instructions supplied with the sensor for proper wiring connections.
WARNING: All connections/disconnections should be made with the controller powered off.
Micro Thermo Technologies™ supplied sensors should be connected as follows:

- **Temperature Sensors**: Connect one lead to Signal Common (⏚); connect the other lead to the desired Universal Input (UI). *Temperature sensors are not polzarized.*
- **Pressure Transducers:** Connect the Red lead to controller's five volt supply (5V); connect the Black lead to Signal Common (⏚); connect the Green lead to the desired Universal Input (UI).
- **Humidity Sensor:** Connect he Red lead to the controller's fifteen volt supply (15V); connect the Black lead to Signal Common (⏚); connect the Green lead to the desired Universal Input (UI).

For all other sensor types, refer to the instructions supplied with the sensor for proper wiring.
The USB port are for service purposes only and must not be used to power appliances.



WARNING!: Remove power before adding or removing expansion module to avoid dammage

Basic Setup

Initial Controller Setup

With the controller wired and powered on, the U700 controller must now be installed through MT Alliance™. In order to set up Alliance, you must have correct permissions to access Configuration mode in the Subsystem that the controller is being installed.

1) Select the appropriate Subsystem for the points being monitored (e.g., Refrigeration).
2) Select Configuration mode.
3) Select the desired view and zoom level where the Sensor Node is installed.

Dropping a Sensor Node

To begin, an instance of the controller must be set up in Alliance. This is done by adding a node in the Alliance view:

1) Drag a Node from the Component list into the view where the controller is installed.
2) In the "Pick Node Type and Model" window that opens, select:
   Transceiver: TP/FT-10
   Channel: *select the correct network channel; default: Backbone*
   Node Type: Sensor Node
   Manufacturer: Micro Thermo
   Model: Univ Sen Node MT700 Vx.x
3) Confirm the Visibility and Appearance settings, and press 'OK'.

NOTE: The node icon can be moved to a different position in the current view. While holding the CTRL key, click-and-drag the icon to the desired location.

Installing the Node

Next, for the U700 controller to be paired with Alliance and the firmware installed on the controller:

1) Click on the newly created node icon.
2) In the configuration window that opens, give the controller a unique, meaningful name in the 'Identification' field.
3) Select the 'Commands/Status' tab.
4) Click the 'Install' button. *If prompted, click 'Yes' to save changes.*
6) On the U700 controller, press the Service (Srv) button.
7) After Alliance finishes sending the firmware and configuration parameters, Alliance will return to the Sensor Node Information window. Click 'OK' to close.

Adding Sensors in Alliance

Each sensor connected to the Sensor Node will have its own entity in Alliance. This entity hosts the configuration settings for the particular sensor, and acts as a visual representation of the sensor status. The following must be completed for each sensor:

Dropping a Sensor

1) Drag a Sensor from the Component list into the Alliance view where the sensor is installed.
2) In the "Pick Sensor Type and Model" window that opens, select:
   Name: *select the sensor type (temperature, pressure, etc)*
   Manufacturer: *select the sensor manufacturer (Micro Thermo, Sporlan, etc)*
   Sensor Model: *select the specific sensor installed*
3) Leave all other defaults, and press 'OK'.

NOTE: The sensor's icon can be moved to a different position on the current view. While holding the CTRL key, click-and-drag the icon to the desired location.

Configuring a Sensor

1) Click on the newly created sensor icon.
2) In the sensor configuration window, give the sensor a unique, meaningful name in the 'Identification' field.
3) Select the 'Hardware' tab.
4) Confirm the manufacturer and sensor model are correct from earlier.
5) In the 'Sensor Node' field, select the controller that this sensor is connected to.
6) In the 'Sensor Node Input' field, select the input location for the sensor. The inputs are numbered sequentially, starting with two inputs on the Main controller and proceeding to the first expansion module. The inputs are also identified – in parenthesis – by two numbers, corresponding to the module number and input number.
   For example: Input (1-2) is Input No. 2 on the Main Controller; Input (2-6) is Input #6 on the second module.
7) Select the 'Alarm' tab.
8) Configure the sensor's alarm settings, by either selecting a preset or manual configuration. To select a preset: click the 'Pick Alarm Settings' button, select a preset from the list, and click 'OK'. Or to manually configure the alarm settings, fill in the following fields:
   Description: *(optional)*
   Optimal Value: *specify the desired sensor reading – displayed on trend graph for reference*
   High/Low Limit: *specify the upper/lower threshold, above/below which an alarm will be generated*
   Set Time: *specify the time delay, during which the sensor must remain outside of the high/low limit, before an alarm is generated*
   Recall Time: *if an alarm is Acknowledged in Alliance but the alarm condition persists, the alarm signal will be re-activated after the delay specified here. This feature ensures alarms conditions are not dismissed or forgotten without being resolved.*
   Priority Level: *specify the severity of the alarm. Temperature alarms should be considered high priority.*
   Relay: *specify the external relay to be activated when an alarm is generated (optional)*
9) Click 'OK' to close the sensor window. If prompted, click 'Yes' to save changes.

Basic Operation

Status

Controller

The U700 controller has five LED status lights. These indicators represent the basic operational status of the controller.

The Main Controller ***Status*** LED shows the current programming status of the controller. In Normal mode, the light will flash twice followed by a delay. This pattern repeats every two seconds. In Wink mode, the light will flash fast for up to 60 seconds.

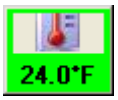
The Second Module ***Status*** LED shows the communication status with the main controller. The light flashes green during normal operation, and red if communication is lost.

The ***Lon Rx/Tx*** LED shows activity on the LonWorks® network.

The ***RS485 Rx/Tx*** and ***Ethernet Act/Lnk*** LEDs are not used on U700 Monitoring Node.

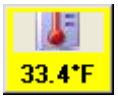
Alliance

Alliance utilizes the sensor icon to display general status information for quick view and monitoring. Each sensor icon is color coded for its current state and, depending on the zoom level, displays the sensor value and an image corresponding to the sensor type.
The sensor icon will appear similar to the following:



- The sensor is operating normal and is within all alarm setpoints.

- The sensor alarm is active and requires attention.



- The sensor alarm is in Recall mode; the first alarm has been acknowledged, but the cause has not been resolved and the alarm has been reactivated.

- The alarm has been disabled, either temporarily or permanently, for this sensor.

- Communication has been lost with the sensor controller, and Alliance does not know the current status of the sensor.

Clicking on the icon opens the Sensor Information window, where detailed status and sensor history is available.

Trend Graphs & Sensor History

The 'Graph & Log' tab in the sensor configuration window provides access to the complete history of the sensor. The graph displays sensor readings for up to five years, along with the optimal value, high/low alarm limits, when the alarm was active, and the cumulative alarm time (if applicable). The graph's zoom level can be set to display between 1-Hour and 4-Days of data at a time; and the statistical data displayed along the right-hand side is continuously updated to correspond to the time period of the graph. For more in depth diagnostic, the 'Trend Graphs' button opens the Trends Graph window, where the sensor's value can be displayed simultaneously with any other MT Alliance™ saved point.
The lower section of the 'Graph & Log' tab provides a detailed list of all modifications made to the sensor since it was installed. In addition to standard log events, new entries can be created manually; this allows explanations, reminders, or general notes to be permanently recorded and attached the individual sensor.

Reports

Sensors can generate automatic, printed reports. These reports can be generated upon acknowledgement of an alarm, as a daily report, or both. To configure reports, open the 'Details' tab in the sensor configuration window. In the upper right section, select the desired Reporting Preferences.
Additional Daily Report settings can be found on the Alliance 'Reports' menu.

Changing Settings

Many settings for sensors can be changed at any time, should the need arise. However, there are a few exceptions:

1) The (hardware) Model cannot be changed on a Node after it has been dropped in Alliance. To change hardware type, the node must be deleted and a new node dropped.

2) The Subsystem cannot be changed on a Node after it has been dropped in Alliance. To change subsystems, the node must be deleted and a new node dropped.
3) The sensor type cannot be changed on a Sensor after it has been dropped in Alliance. To change sensors, the sensor must be deleted and a new sensor dropped.

NOTE: If a Node or Sensor is deleted in Alliance, its history and logs will also be removed.

Additional Features

Alarms

Alarm Set 2

In addition to the standard alarm threshold, the controller provides a second set of alarm parameters that can be used to complement the primary alarm. The second set is usually configured with narrower alarm limits, but a longer set time. This can be used to identify poorly performing equipment and warn when product shelf life may be reduced. For example, the primary alarm can be set to activate if the measured temperature is 15°F above optimal for one hour; but the second alarm can be set to activate if the measured temperature is 8°F above optimal for four hours. This second condition may not warrant a high priority alarm; but it can be a good indicator that the system needs attention.

By default, Alarm Set 2 is inactive and must be enabled on each sensor.

To configure Set 2, open the 'Alarm Settings' tab in the sensor configuration window. In the lower right portion, click 'Set 2 Active' and modify the alarm settings as desired. Click the 'OK' button to save changes.

NOTE: When a sensor is configured for Dual Use, Set 2 is used as the primary alarm for the second temperature setting. For details, see the Dual Use Sensors section.

Cumulative Alarms

One advanced feature built into Micro Thermo monitoring is Cumulative Alarming. The Cumulative Alarm monitors an input over an extended period of time (usually 24 or 48 hours), and calculates the total time that the input exceeds the high/low limits. This differs from the standard alarm sets, which require a continuous high/low measurement to activate. Instead of resetting every time the measurement returns within limits, the Cumulative Alarm counts all current and previous exceptions that occur within the Cumulative Period.

The Cumulative Alarm is an integral part of temperature monitoring, for maintaining food quality and shelf life. The cumulative effect of temperature variations has a significant impact on refrigerated food. The variations can also be an indicator of current or developing issues in the system – the instability being caused either adjacent to the sensor or propagating from elsewhere in the system. In either case, a Cumulative Alarm should be investigated to determine the cause.

To configure the Cumulative Alarm, open the 'Alarm Settings' tab in the sensor configuration window. In the upper right section, select the alarm set to use for high/low limits and then specify the Set Time and Cumulative Period parameters.

Disabling Alarms

The U700 Monitoring Node allows alarms to be disabled for individual sensors. Permanently disabling an alarm inhibits all alarms for that specific sensor. This remains in effect until a technician manually re-enables the alarm through Alliance. While an alarm is disabled, the icon in Alliance will appear light blue for easy identification. However, if a sensor never requires an alarm (e.g., an auxiliary input), it may be preferable to leave the alarm enabled with the alarm limits set to the sensor's min/max range. This will effectively disable the alarm, but will not affect the Alliance display.

Alarms can also be temporarily disabled on sensors. This is often used during a maintenance call when it is known that repair work will exceed the alarm set time (or recall time); in this case, the alarm is disabled to prevent nuisance alarms. Temporarily disabling an alarm requires the technician to specify an end time. At this time, the controller automatically reactivates the alarm.

To disable an alarm, open the 'Alarm Settings' tab in the sensor configuration window. In the upper left portion, select 'Disable Alarm Permanently' or 'Disable Alarm Temporarily'. Specify a reason (optional) for the action, which will be visible to other users and recorded in the historical log. When disabling temporarily, specify the end time. *Leaving this at the default value will cause the alarm to remain enabled.*

NOTE: The temporary alarm details are stored in volatile memory on the controller. This information will be lost if the controller is reset – either through the Alliance software, at the board, or if power to the board is interrupted. When the controller is reset, it resumes all alarm settings. However, Alliance may still show the alarm as disabled until the end time is reached.

Dual Use Sensors

The U700 Monitoring Node includes Dual Use capability for each sensor on the controller. Dual use sensors allow for two sets of alarm limits to be configured and stored, with only one applied at a time. When an assigned switch is toggled (either a software or physical switch), the controller automatically applies the sensor's alternate alarm settings. When the switch is toggled back, the controller returns to the primary settings. This feature allows for quick, error-free changeover in dual use equipment.

Each dual use sensor must be associated with a switch. But one switch can control multiple dual use sensors, including sensors on different controllers. At any point, a sensor can be changed back to Single Usage, and the Alarm Set 1 settings will be retained.

To configure a sensor for dual use, first open the 'Details' tab in the sensor configuration window. In the lower right section, select Dual Usage. Open the 'Hardware' tab and locate the Dual Use Switch settings in the top right. For a **physical switch**, select the Hardware Switch option and then specify the Sensor Node and Input where the switch is wired. For a **software switch**, select the Software Switch option. When the software switch is enabled, changing the dual use from Set 1 to Set 2 is as simple as clicking on an icon. Click on the sensor icon in Alliance to open the Sensor Information window. At the bottom, center of the window, locate the two alarm settings with the image of a light switch between. Click on the desired alarm setting to activate that Alarm Set. Alternatively, click on the switch icon to toggle back and forth between the two settings. Click 'OK' and save modifications when complete.

Remote Sensors

The U700 monitoring node includes the capability to monitor network variables, in the same way the controller would monitor the values from a physical sensor. This Remote Sensor feature allows the MT Alliance system to: (1) record history and generate alarms for Calculation Block values; (2) generate custom alarms for sensors connected to other Micro Thermo Technology controllers, without needing to add duplicate sensors.

To configure a remote sensor, open the 'Details' tab in the sensor configuration window. In the Source section, select Remote. Open the 'Hardware' tab and select the Sensor Node and Input (under Primary Resource) where the sensor value will be simulated. In the Remote Source section, select the source type and location from where the value is generated.

NOTE: Remote sensors utilize the same resources on the Sensor Node as a physical sensor. Therefore, a remote sensor requires an open input on the controller; and a physical sensor cannot be assigned to an input already assigned to a remote sensor.

Calculation Blocks

The Calculation Block provides basic mathematical functions, which allow the U700 controller to calculate the Minimum, Maximum, or Average of specified values. Each block accepts up to 26 inputs, which can be a combination of: local sensor values, remote sensor values, network variables, and results from another calculation block (local or remote). The result is calculated and available through a new Remote Sensor or the *nvoUnivCalc* network variables. Each U700 controller features four Calculation Blocks.

To configure a Calculation Block, open the node configuration window and select the 'Calculation' tab. Local and Remote resources must be configured before the calculation blocks can be set up. For Remote sources, click one of the Remote Source buttons and specify the Type and Source. After all sources are set up, click one of the Calculation Block buttons. Give the block at Description, check all of the Sources to use in the calculation, and specify the Type, Operator, Range, and Send on Delta values.

NOTE: The standard calculations operations cannot be performed on a switch-type (on/off) input. Instead, when 'Switch' is selected, the Calculation Block allows the following bitwise operations: AND, NAND, OR, NOR, XOR, XNOR.

NOTE: Calculations can only be performed on inputs of the same data type. MT Alliance™ enforces this rule, and will only allow the user to select inputs that match the specified data type.

Appendices

U700 Technical Specs (MT-722A + MT-716U)

Power Supply:
24VAC, 50/60Hz
0.63A Maximum Consumption

Analog Inputs:
(18) Universal Inputs:

- *Micro Thermo Technologies 10K thermistor (-50°C to 150°C)*
- *0-5 VDC (Ratiometric)*
- *0-10 VDC*
- *0-20 mA (with external resistor)*
- *PT1000 (-100°C to 325°C)*
- *Switch (Voltage-Free)*

Network Connection:
(1) LonWorks TP/FTT-10 Network @ 78kbps
***Wire**: 18 AWG 7/26 stranded, unshielded twisted pair (Belden 8461 or equivalent)*

Operating Temperature:
-13°F to 140°F (-25°C to 60°C)
0-90% RH (non-condensing)

Storage Temperature:
-13°F to 158°F (-25°C to 70°C)
0-90% RH (non-condensing)

Wiring:
Screw Terminals

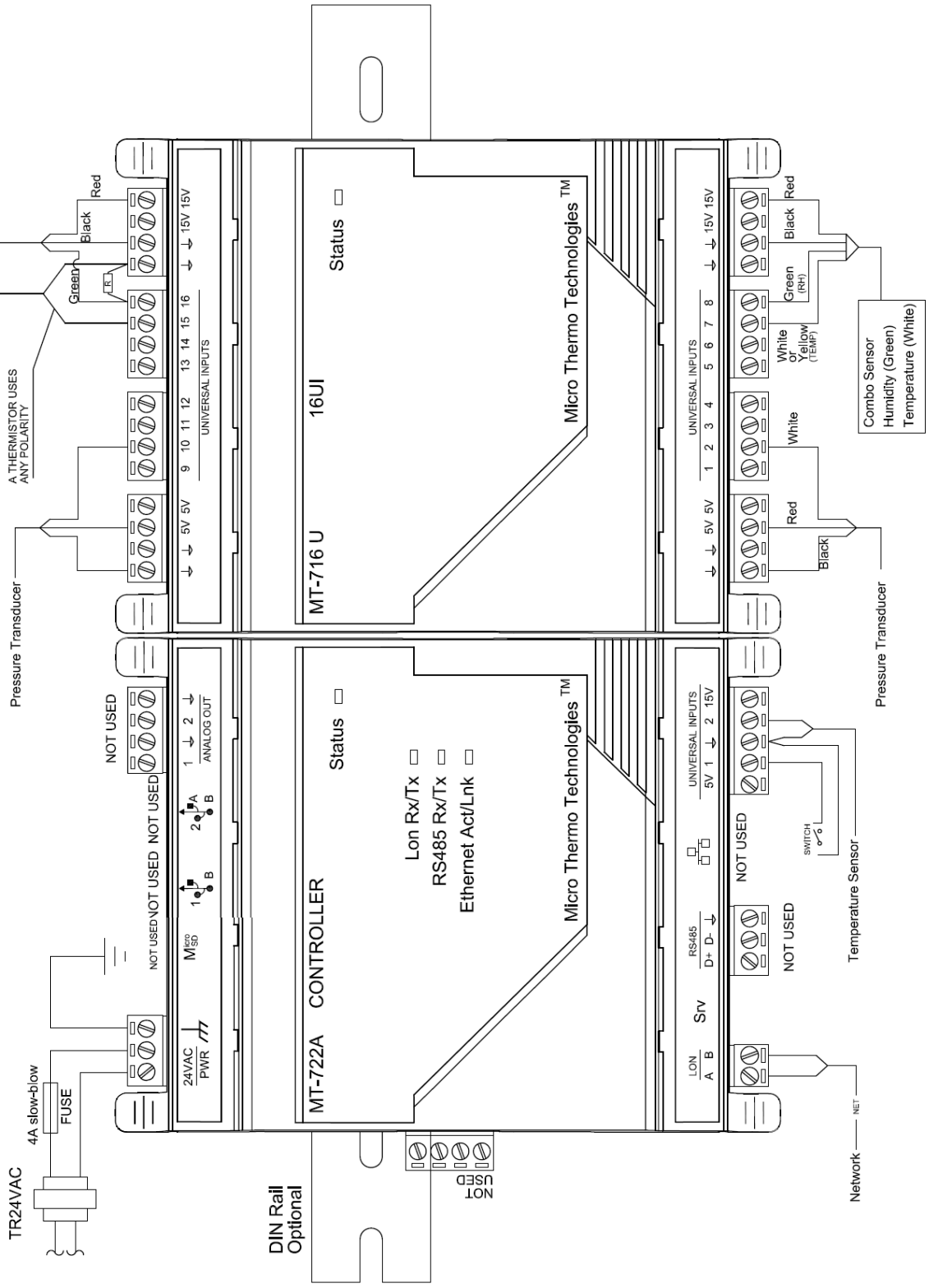
Mounting:
Wall mount or DIN rail (EN 50022)

Dimensions:
8.90 x 5.97 x 2.20 inches
226 x 152 x 56 mm

Compliance:
UL/CUL Listed

Manufactured by:
Parker Hannifin Canada
12855 rue Brault
Mirabel, Qc, Canada
J7J 0C4

U700 Field Wiring



System Specification

MT-722A (A may be another letter)	MAIN CONTROLLER
Power supply:	
Inputs:	24 Vac +/-10% (30 Vac Absolute maximum) 0.30 A (rms) max. ◂ no load 0.44 A (rms) max. ◂ full load on 5V/15V outputs 0.70 A (rms) max. ◂ USB and 5V/15V outputs fully loaded 4.8 A (rms) max. ◂ Main controller + extra MT-700 modules
Universal input (x2)	"0-10V" / thermistor / RTD
Outputs:	
MT-700 DC power bus (to other MT-700 modules)	Unregulated 30 Vdc supply: 2 A max. (short-circuit protected)
Analog output (x2)	"0-10V" / "0-20mA"
5.0 Vdc output	30 mA max. (internally limited), ratiometric
15 Vdc output	100 mA max. (internally limited)
Communication:	
LonWorks port	TP/FT-10 channels transceiver featuring polarity-insensitive free topology star, daisy chain, bus, loop, or mixed topology wiring. 78 kilobits per second. Supports up to 254 Network Variables
Ethernet port	10Base-T/100Base-TX Auto MDI/MDI-X for detection and correction of crossover cables Auto-negotiation to automatically select the highest link-up speed LED for link and activity status indication DHCP support
RS-485 port	On board network terminator Up to 64 transceivers on the bus
USB "OTG" port	Can be a USB host or a USB device Full Speed. USB 2.0
USB "Device" port	Full Speed. USB 2.0 MSD (mass storage device) profile currently supported *The USB port are for service purposes only

MT-722A (A may be another letter - suite)	MAIN CONTROLLER
Options:	
Remote display port (RS-485) MicroSD memory card Indicators & Buttons:	Power and data connection for MT-700 compatible displays SD up to 2GBytes, SD HC cards up to 32GBytes (for application files or data logging file storage)
Status Green LED Status Red LED LonWorks Tx LED LonWorks Rx LED RS-485 Tx LED RS-485 Rx LED Ethernet LNK LED Ethernet ACT LED "Service" button Hardware features:	
Microcontroller	ARM Cortex-M4, with FPU (floating point unit), 168MHz 2Mbytes of Flash Memory for program 260K of SRAM (4K on battery back-up) for data. Real Time Clock with battery back-up
Flash memory	2Mbytes with file system (for application or data logging file storage) on SPI (microcontroller external Bus)
EEPROM memory	64Kbytes (for parameter storage) on SPI (microcontroller external Bus)
RTC battery (not on MT-722**G**) **Optional when product ship out from factory** UL warning markings	Panasonic or Energizer CR1220 (3V lithium coin cell) for internal clock in case of power outage when no BAS is used Caution: The cell used in this device may present a risk of fire or chemical burn hazard if mistreated. Do not (recharge), disassemble, heat above 100°C (212°F) or incinerate. Replace cell with Panasonic or Energizer CR1220 model only. Use of another cell may present a risk of fire or explosion.

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MT-716U	16UI
Power supply:	
Inputs:	MT-700 DC power bus 0.06 A max. ◂ no load on 5V/15V outputs 0.19 A max. ◂ full load on 5V/15V outputs
Universal input (x16) Outputs:	"0-10V" / thermistor / RTD
5.0 Vdc output 15 Vdc output Indicators / Buttons:	200 mA max. (internally limited), ratiometric 100 mA max. (internally limited)
Status Green LED Status Red LED Hardware features:	
Microcontroller	ARM Cortex-M0, 48MHz 64Kbytes of flash memory for program 8K of SRAM for data

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MT-784A	8UI / 4RO
Power supply:	
Inputs:	MT-700 DC power bus 0.10 A max. ◂ no load on 5V/15V outputs 0.20 A max. ◂ full load on 5V/15V outputs
Universal input (x8)	"0-10V" / thermistor / RTD
Outputs:	
Relay output (x4)	1 form C (Dry contact) 5A / 250V Max, fuse protected (2AG / 5A / 250V)
5.0 Vdc output	100 mA max. (internally limited), ratiometric
15 Vdc output	100 mA max. (internally limited)
Indicators / Buttons:	
Status Green LED	
Status Red LED	
Relay status LED (x4)	Status of relays (RO) 1 to 4
Relay test button (x4)	To manually activate relays (RO) 1 to 4
Hardware features:	
Microcontroller	ARM Cortex-M0, 48MHz 64Kbytes of flash memory for program 8K of SRAM for data

20 FE 2018

MT-742V	4UI / 2MVC
Power supply:	
Inputs:	MT-700 DC power bus 0.05 A max. ◂ no load on 5V/15V outputs, MVC outputs off 0.11 A max. ◂ full load on 5V/15V outputs, MVC outputs off 0.74 A max. ◂ full load on 5V/15V outputs, MVC outputs active
Universal input (x4) Outputs:	"0-10V" / thermistor / RTD
MVC output (x2) 5.0 Vdc output 15 Vdc output Indicators / Buttons:	Modulating Valve Control for bipolar (4-wire) stepper motor Current limited Motor coil resistance range: 6 Ω to 100 Ω (1.4 W to 6 W) 65 mA max. (internally limited), ratiometric 50 mA max. (internally limited)
Status Green LED Status Red LED Valve 1 status LED Valve 2 status LED Hardware features:	
Microcontroller	ARM Cortex-M0, 48MHz 64Kbytes of flash memory for program 8K of SRAM for data

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MT-766A	6UI / 2AO / 4RO
Power supply:	
Inputs:	MT-700 DC power bus 0.12 A max. ◂ no load on 5V/15V outputs 0.22 A max. ◂ full load on 5V/15V outputs
Universal input (x6)	"0-10V" / thermistor / RTD
Outputs:	
Analog output (x2)	"0-10V" / "0-20mA"
Relay output (x4)	1 form C (Dry contact) 5A / 250V Max, fuse protected (2AG / 5A / 250V)
5.0 Vdc output	100 mA max. (internally limited), ratiometric
15 Vdc output	100 mA max. (internally limited)
Indicators / Buttons:	
Status Green LED	
Status Red LED	
Relay status LED (x4)	Status of relays (RO) 1 to 4
Relay test button (x4)	To manually activate relays (RO) 1 to 4
Hardware features:	
Microcontroller	ARM Cortex-M0, 48MHz 64Kbytes of flash memory for program 8K of SRAM for data

20 FE 2018

MT-708V	8MVC
Power supply:	
Outputs:	MT-700 DC power bus 0.04 A max. ◂ MVC outputs off 0.67 A max. ◂ MVC outputs active
MVC output (x8) Indicators / Buttons:	Modulating Valve Control for bipolar (4-wire) stepper motor 2 banks of 4 outputs with only one output active per bank Current limited Inactive outputs are high impedance (no holding current) Motor coil resistance range: 6 Ω to 100 Ω (1.4 W to 6 W)
Status Green LED Status Red LED Valve status LED (x8) Hardware features:	Status of MVC outputs 1 to 8
Microcontroller	ARM Cortex-M0, 48MHz 64Kbytes of flash memory for program 8K of SRAM for data

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MT-708R	8RO
Power supply:	
Outputs:	MT-700 DC power bus 0.10 A max.
Relay output (x8)	1 form C (Dry contact) 5A / 250V Max, fuse protected (2AG / 5A / 250V)
Indicators / Buttons:	
Status Green LED	
Status Red LED	
Relay status LED (x8)	Status of relays (RO) 1 to 8
Relay test button (x8)	To manually activate relays (RO) 1 to 8
Hardware features:	
Microcontroller	ARM Cortex-M0, 48MHz 64Kbytes of flash memory for program 8K of SRAM for data

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Relay Outputs (RO)	
Used on …	8RO, 8UI/4RO, 6UI/2AO/4RO
Contacts	1 form C (Dry contact) (SPDT), 5A, 250Vac 250Vac insulation between adjacent circuits
Fuse	2AG / 5A / 250V / Slow or fast acting
Life	100K cycles at 5A 250VAC resistive load on NO. 30K cycles at 5A 250VAC resistive load on NO or NC. Pilot duty 30VDC 1A on NO or NC.

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Universal Inputs (UI)	
Used on …	Main controller, 16UI, 8UI/4RO, 6UI/2AO/4RO, 4UI/2MVC
Analog to Digital converter	12-bits (embedded in microcotroller)
Sensor type	Selectable by software: Micro Thermo 10K thermistor -50°C to 150°C 0-5Vdc ratiometric 0-10Vdc 0-20mA (with external resistor) PT1000 (1000Ω @ 0°C) -100°C to 325°C Switches (voltage free) Minimum pulse detected ??? More models may be added using MT-Alliance.
Time constant	Software selectable
Input Precision	coming...
Power supply outputs (for sensors)	5V(ratiometric) 15V (see specific module specification for maximum load)

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Analog Outputs (AO)	
Used on …	Main controller, 6UI/2AO/4RO
Digital to Analog converter	12-bits (embedded in microcotroller)
Output modes	Software selectable: 0-10V, limited to 20mA (500Ω min.) 0-20mA, limited to 10V (500Ω max.)
Output Precision	coming...
Settling time	6mS (max.) (0 to 100% in voltage mode) (0 to 90% in current mode)
Minimum pulse width	0V-10V-0V coming...

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Temperature range (for all MT-700 modules)	
Operating	-25°C to 60°C, 90% RH non-condensing
Storage	-25°C to 70°C, 90% RH non-condensing

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