![Produal — measure-be sure.]

TRI-1R and TRI-P-1R Series Modbus / BACnet / Analogue Touchscreen Room Interfaces

The TRI-1R series Modbus / BACnet / Analogue Touchscreen Room Interfaces provide modern looking thin profile user interface and I/O-module for flush mounting in room spaces.

The TRI series interfaces have attractive 3.5" backlit touchscreen with smart designer interface. TRI-P-1R/TRI-3A versions have 7-day time clock to provide network clock facility.

The MOD models have built-in Modbus RTU communications and the BAC models provide BACnet MS/TP communications. The analogue versions can be used with BMS 0-10Vdc input cards.

Features

- 24VAC/DC Power Supply
- 3.5" Inch Backlit Touchscreen Display
- BACnet and Modbus Communication Models, Analogue Version
- P-Versions have 7 Day and 5+2 Day Schedule
- Flush Mounting in the UK, EURO and US Wall Mounting Box
- Attractive Modern Designer Look

- Built-In Temperature Sensor
- 2 x Remote NTC10 Sensor Inputs
- 250Vac Switched Network Relay (TRI-1R)
- 3 x 0-10Vdc Outputs (TRI-3A)
- Digital Input for Overrides / Measurement

Ordering guide		Type	0	1	2	3	4	5	6
0 Touchscreen room units			6001					0	
1 Device type	Room unit, 2RI, 1DI, 1RO	TRI-1R		6					
	Room unit, 2RI, 1DI, 1RO, 7-days schedule	TRI-P-1R		7					
	Room unit, 2RI, 1DI, 3AO	TRI-3A		8					
2 Communication	No Communication (only TRI-3A)				A				
	Modbus	-MOD			M				
	BACnet	-BAC			B				
3 Power supply	24 Vac/dc	-24				2			
	12 Vdc (only TRI-1R)	-12				1			
4 Additional measurements	No additional measurement						0		
	Relative humidity	-RH					1		
	CO_2	-CO2					2		
	Relative humidity and CO_2	-RH-CO2					3		
5 Reserved								0	
6 Body colour	Chrome								0
	White (RAL 9010)	-W							W
	Black (RAL 8022)	-B							B

Technical Data

Power Supply	Power:	24VAC/DC -10%/+15%, max. 80mA
Display	Touchscreen	3.5" Backlit Touchscreen, 320 x 480 pixels, 255K colours
Network Signal Outputs	Relay Output (TRI-1R)/TRI-P-1R	1 x 7A (res.) / 2.2A (inductive) at 230VAC / 1.3A (inductive) at 115VAC
	Relay Output (TRI-xx-CO2)	1 x 0.5A (res.) at 230VAC / 0.5A (res) at 125VAC (with CO2 option)
	Analogue Outputs (TRI-3A)	3 x 0..10V Outputs, Max 5mA
Network Signal Inputs	Built-In Sensor	0..50°C (32..122°F) ±0.5°C @ 25°C
	External Sensor Inputs	2 x External NTC10K3 Sensors
	Digital Input	1 x Digital Input, Volt-Free Contact, Impedance <1KOhm
Optional Sensing Characteristics	Humidity (RH Models)	
	Range	0..100%rH
	Accuracy	±2% rH (within 20..80% rh)
	Carbon Dioxide (CO_2 Models)	
	Range	0...5000ppm CO_2
	Accuracy	± 50ppm + 3% of the reading @ 25°C (@77°F)
	Technology	Auto Calibrating; Patented Non-Dispersive Infrared (NDIR)
	Non-Linearity	<1% FS
	Warm-Up Time	<20 seconds
	Response Time	2 minutes
Communication	Modbus (-MOD models)	
	Protocol	Modbus RTU
	Interface	RS485; maximum 63 devices per segment
	Addressing	1 to 247 via Touchscreen
	Communication	9k6/19k2/38k4/57k6/76k8 Baud; Parity None/Even/Odd, 1 or 2 Stop Bits (adjustable through Touchscreen)
	BACnet (-BAC models)	
	Protocol	BACnet MS/TP
	Interface	RS485; maximum 63 devices segment
	MAC Addressing	0 to 127 via Touchscreen
	Device ID	Default 651000 + MAC Address, User Configured
	Communication	9k6/19k2/38k4/57k6/76k8 Baud; Parity None/Even/Odd, 1 or 2 Stop Bits
Connections	Terminal Connections (Relay & Power Supply)	Solid and Stranded Cable Maximum Size: Solid; 0.05-2.5mm², Stranded: 0.05-1.50mm² Rising Clamp: Size 2.5 x 2.2mm
	Terminal Connections (Low Voltage Terminals)	Solid and Stranded Cable; 90° Angle for Wiring Maximum Size: 0.05 to 1.5mm² (EN ISO) / 14 to 30 AWG (UL) Rising Clamp: Size 2.5 x 1.9mm
Environmental Conditions	Operating	
	Temperature	0°C...+50°C (32..122°F)
	Humidity	0...95%rh (non-cond.)
	Storage	
	Temperature	-30°C...+70°C (-22..158°F)
	Humidity	0...95%rh (non-cond.)
Standards	CE Conformity	CE Directive 2004/108/EC (EMC), 2006/95/EC (LVD) EN61000-6-3: 2001 (Generic Emission) EN61000-6-1: 2001 (Generic Immunity)
	Degree of Protection	IP20
Housing	Housing Material	Polycarbonate Plastics, Self Extinguishing (V0 rated)
	Mounting	Wall or Junction Box Mounting, Silver and Black W-Option: White Enclosure - Black Front B- Option: Black Enclosure - Black Front
	Dimensions	W88 x H112 x D43mm; Flush: W88 x H112 x D14.5mm CO Models: W88 x H112 x D49mm; Flush: W88 x H112 x D20.5mm

Weight	220g

TRI-1R / TRI-P-1R Wiring Connections

TRI-1R / TRI-P-1R WIRING
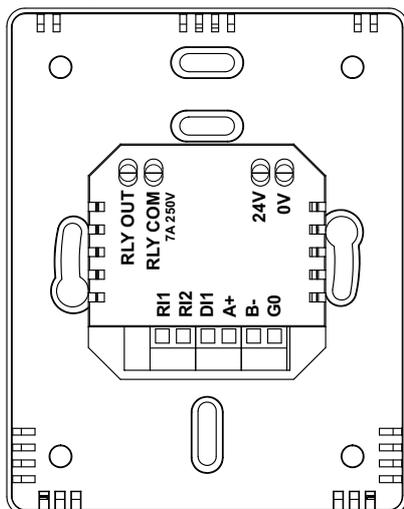
CONN	DESCRIPTION
RELAY OUT	250VAC/30VDC 7A Relay Contact
RELAY COM	250VAC/30VDC 7A Relay Contact
24V	24Vac/dc Supply
0V	0V Supply
Rin1	Remote NTC10 Temperature Sensor Input 1
Rin2	Remote NTC10 Temperature Sensor Input 2
Din	Volt-Free Digital Input Contact
485A+	Modbus / BACnet MS/TP RS485 A+ Connection
485B-	Modbus / BACnet MS/TP RS485 B- Connection
G0	0V Common

TRI-3A Wiring Connections

TRI-3A WIRING
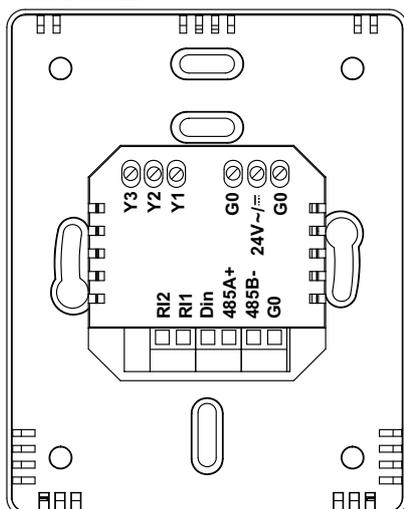
CONN	DESCRIPTION
Y1	0..10Vdc Analogue Output 1 - default fan speed
Y2	0..10Vdc Analogue Output 2 - default setpoint
Y3	0..10Vdc Analogue Output 3 - default sensor 3 (built-in sensor)
24V	24Vac/dc Supply
G0	0V Common
RI1	Remote NTC10 Temperature Sensor Input 1
RI2	Remote NTC10 Temperature Sensor Input 2
Din	Volt-Free Digital Input Contact (dry contact)
485A+	Modbus / BACnet MS/TP RS485 A+ Connection
485B-	Modbus / BACnet MS/TP RS485 B- Connection
G0	0V Common

WARNING:Switch off the power before any wiring is carried out.

Typical User Interface Screens

The images below illustrate the typical home screens on the TRI user interfaces. The screen is touch sensitive and shows the current status of the system. Inside the red/blue/white ring the device shows the current target value (temperature / %).

The colour of the blue red/blue ring can be set over the network. As default the ring's intensity changes based on the target value differing from the sensor 3 (built-in sensor) measurement.

The small action circle indicates the current measurements / network values in rotation.

ICON DESCRIPTION

RED RING
BLUE RING
WHITE RING
COMMS MESSAGE
CLEANING MODE
SCREEN LOCKED
LIGHTS ON
AIR/CON ON
ERROR
OFF MODE
MAINTENANCE MODE
PARTY MODE
ECO MODE
FROST ICON
SET TIME AND DATE
SET TIME PROGRAMS

TRI WITH RED DISPLAY

21.5 ℃

Room 20.1 ℃

STATUS INFORMATION BANNER

FUNCTION BASED ICON AREA (PARTY MODE / ON-OFF/ECO ICON)

IN AUTO MODE INTENSITY OF THE RED AND BLUE CHANGES DEPENDING ON DIFFERENCE BETWEEN TARGET AND ZONE1 MEASUREMENT

A/C AND LIGHTS STATUS AND SWITCH ON/OFF

SMALL ACTION CIRCLE

CONTROL MODE (AUTO/HEATING / COOLING / FAN VENTILATION

TRI-P WITH ON/BLUE DISPLAY

21.5 ℃

Room 23.8 ℃

FAN

PRESS UP AND DOWN ARROWS TO ADJUST TARGET VALUE

TRANSITIONS BETWEEN ROOM - ZONE2 - ZONE3 - RH IF FITTED / ENABLED

Zone 2 20.8 ℃

Zone 3 10.5 ℃

Humidity 45 %

THE SMALL INFO CIRCLE ACTS ALSO AS AN ACTION AREA FOR FURTHER SETTINGS

TARGET IN PERCENTAGE, WHITE

50.0 %

Room 20.1 ℃

TRI WITH FAN SPEED

21.5 ℃
A

Room 20.1 ℃

The TRI-1R room interface home screen has four touch sensitive areas that allow the system settings to be altered. All parameter values are available as Modbus/BACnet network variables. Fan speed and setpoint are available as 0-10Vdc outputs with TRI-3A.

- UP and DOWN arrows; to alter the current target (temperature / % value).
- SMALL ACTION CIRCLE (that contains current main zone temperature etc.); allows access to FURTHER SETTINGS AND INFORMATION screen.
- FUNCTION BASED ICON; in PARTY mode shows the PARTY icon; in OFF mode shows the OFF icon. Pressing the icon the mode can can be cancelled.
- FAN SPEED ICON; when FAN display is enabled, the fan ICON can be used to control the fan speed (up to 7 steps, AUTO-0-1-2-3-4-5-6)
- ECO ICON; when set the ECO mode icon is displayed below the fan speed
- A/C ICON; when AC is enabled the AC can be enabled/disabled from this icon
- LIGHTS ICON; when LIGHTS are enabled, the lights can be enabled/disabled from this icon

On TRI-P-1R version we also have additional display for the time schedule.

- NEXT > [TIME] area; shows until what time the current switching time is active.

Touchscreen Backlight

The touchscreen backlight level can be adjusted through the maintenance mode. During the normal operation after 30 seconds of inactivity, the touchscreen dims to the "stand-by" level set. If the backlight level is set to 0, the screen backlight switches off.

By pressing the DIM icon when the screen is active the screen is immediately dimmed to the "stand-by" level. Pressing the DIM icon when the device is in the "stand-by level", switches the backlight OFF.

The screen backlight is automatically activated when it is touched.

Measurement Displays

The TRI room interfaces can show up to 3 temperatures (sensor 1, sensor 2, sensor 3) in the ACTION CIRCLE. With the RH humidity sensor option, the relative humidity sensor is also displayed in the ACTION CIRCLE. With CO2 option, the CO2 reading can be displayed in the ACTION CIRCLE.

Outside 20°C.1 Sensor 1 can display the external sensor RI1 temperature, or temperature can be set over the network (if *Sensor1 Source* has been set to network). The description for the temperature can be changed via *Sensor1 Text* parameter in the configuration pages. By setting the description to *Disabled*, the sensor reading is not displayed on the screen.

Floor 20°C.1 Sensor 2 can display the external sensor RI2 temperature, or temperature can be set over the network (if *Sensor2 Source* has been set to network). The description for the temperature can be changed via *Sensor2 Text* parameter in the configuration pages. By setting the description to *Disabled*, the sensor reading is not displayed on the screen.

Room 20°C.1 Sensor 3 can display the built-in sensor temperature, or temperature can be set over the network (if *Sensor3 Source* has been set to network). The description for the temperature can be changed via *Sensor3 Text* parameter in the configuration pages. By setting the description to *Disabled*, the sensor reading is not displayed on the screen.

Note: If all sensor displays are *Disabled,* the ACTION CIRCLE displays the last drawn image.

Setpoint Mode

Inside the large circle on the HOME SCREEN the TRI-1R/TRI-3A shows the target setpoint value. As default the units are in temperature (Celcius / Fahrenheit). It is possible to change the units to 'percentage' to display the target values for percentage based control, or to show temperature only.

Setpoint Mode Options:-

• TEMPERATURE; setpoint in displayed in temperature (Celsius / Fahrenheit).
• PERCENTAGE; setpoint is displayed in percentage
• NONE; no setpoint is displayed. Instead of setpoint the Sensor 3 is displayed inside the circle. If no other measurement is not displayed the ACTION CIRCLE change to the COG WHEEL icon to indicate access to FURTHER SETTINGS screen.

SETPOINT UNIT: TEMPERATURE   SETPOINT UNIT: PERCENTAGE   SETPOINT UNIT: NONE
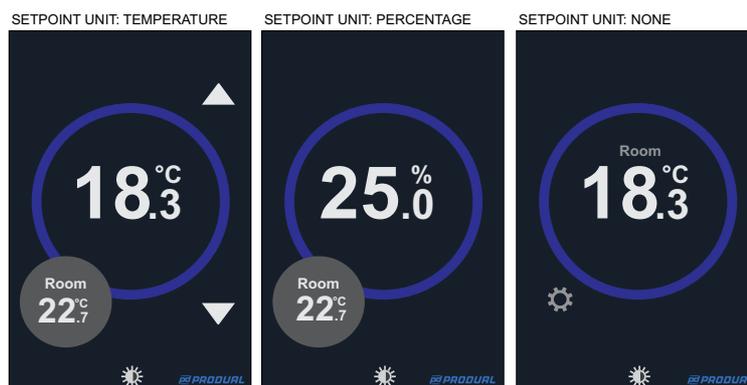
Target Setpoint

Using the arrows up & down the target setpoint can be adjusted. The minimum and maximum user setpoints are configured in the Maintenance mode. With BAC/MOD models the current setpoint is available over the communication network.

With TRI-3A models the target setpoint can be sent to analogue 0-10Vdc outputs. The output value is scaled between Min. Setpoint Adj. and Max. Setpoint Adj parameters. For example, if Min Setpoint = 10 and Max. Setpoint = 30, and the current setpoint target is 22.5, the output will be ((22.5-10.0)/(30.0-10.0))*100.0% = 62.5% (6.25V).

Centigrade to Fahrenheit Display

If Centigrade to Fahrenheit icon has been enabled (parameter System/Show Unit Swap) it is possible on the front screen to change the units by touching this icon.

This option is particularly useful in hospitality applications where the client base is expected to be international.

In addition (from Fw 4.01 onwards) at the commissioning it is possible to select default units from parameter System/Native Units. When changing the Native Units the device carries out Factory Default reload using the selected units (for all relevant settings).


UNIT SELECTION

Warning: After changing the Native Units, the controller reloads defaults for ALL PARAMETERS.The Native Unit selection should be done at the start of the commissioning.

Further Settings and Information

The FURTHER SETTINGS shows additional user settings options on the TRI room interfaces:-

- OFF icon to switch device to OFF (OFF icon is displayed here only if OFF icon has been enabled and the PARTY (BOOST) button has also been enabled)
- LOCK icon is used to lock the device. Number of different lock modes options exist.
- CLEANING icon is used to enable timed cleaning mode.
- CLOCK icon is used to set the time (TRI-P-1R only).
- CALENDAR icon is used to enter the programming screens to set the switching times, the temperature targets (TRI-P-1R only).
- COG WHEEL icon allows entry to the maintenance mode.

FURTHER SETTINGS AND INFORMATION

ENTRY SCREEN

PRESS OFF BUTTON TO SWITCH THE INTERFACE OFF

LARGE CIRCLE CONTINUES TO DISPLAY THE SET COLOUR

ACTIVATE FUNCTIONS BY SELECTING THE ICONS

USE ESC BUTTON TO SET OR WAIT FOR A TIME-OUT

SELECT LOCK ICON TO LOCK THE THERMOSTAT FROM TAMPERING

SET TIME AND DATE (ONLY TRI-P-1R)

MODIFY SWITCHING SCHEDULE (ONLY TRI-P-1R)

TO ENABLE CLEANING MODE TOUCH THE ICON

SELECT CLEANING ICON TO ENABLE CLEANING MODE. THE DISPLAY WILL COUNT DOWN FROM 30 SECONDS DURING WHICH ALL BUTTONS ARE DISABLED ALLOWING SCREEN CLEANING.

SELECT COG WHEEL TO ENTER MAINTENANCE MODE (REQUIRES PASSWORD)

The FURTHER SETTINGS screen is protected by the Staff Code. As default the Staff Code is disabled (0000). If activated, the user will need to enter the *Staff Code* to enter the screen.

Fan Speed Display and Manual Override

The TRI series has fan icon and line bar to indicate the fan speed. It is also possible to use the line bar only to indicate other signals by disabling the fan icon.

The fan and line bar display is configured by a parameter. The options are:-

- DISABLED (Default)
- FAN AND LINE BAR
- LINE BAR ONLY
- FAN ONLY
- FAN AND COLOUR LINE BAR
- COLOUR LINE BAR ONLY
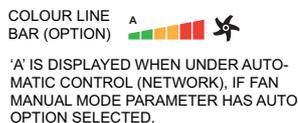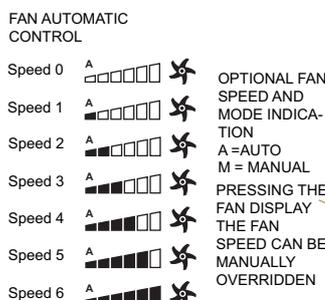
When the fan level set to more than OFF (Speed 0) via network or manually (if enabled), the fan icon rotates. The current fan/level is displayed by the shading of the line bar (in 6 steps/bars).

The shading of the bar can be set to follow greyscale, or green/yellow/red colour scheme.

FAN AUTOMATIC CONTROL

Speed 0
Speed 1
Speed 2
Speed 3
Speed 4
Speed 5
Speed 6

OPTIONAL FAN SPEED AND MODE INDICATION
A =AUTO
M = MANUAL

PRESSING THE FAN DISPLAY THE FAN SPEED CAN BE MANUALLY OVERRIDDEN

COLOUR LINE BAR (OPTION)

'A' IS DISPLAYED WHEN UNDER AUTOMATIC CONTROL (NETWORK), IF FAN MANUAL MODE PARAMETER HAS AUTO OPTION SELECTED.

WHEN FAN SPEED IS 1 TO 6 FAN ICON ROTATES.

The system uses the last command principle. If the fan speed has been set/changed from the network then the display goes to automatic mode (showing 'A' next to the line bar if Auto option selected). When the device is manually overridden then the 'A' symbol changes to 'M' indicating manual operation (only if Auto option has been selected for Manual Control). Otherwise the screen shows only the selected Fan Speed.

1-STEP MANUAL CONTROL	3-STEP + AUTO MANUAL CONTROL	6-STEP + AUTO MANUAL CONTROL
Speed 0	Speed 0	Speed 0
Speed 1	Speed 1	Speed 1
2-STEP MANUAL CONTROL	Speed 2	Speed 2
Speed 0	Speed 3	Speed 3
Speed 1	Auto	Speed 4
Speed 2	SPEED SET BY NETWORK	Speed 5
	THE UNIT RETURNS TO AUTO AUTOMATICALLY IF THE NETWORK WRITES A NEW SPEED	Speed 6
		Auto
		SPEED SET BY NETWORK
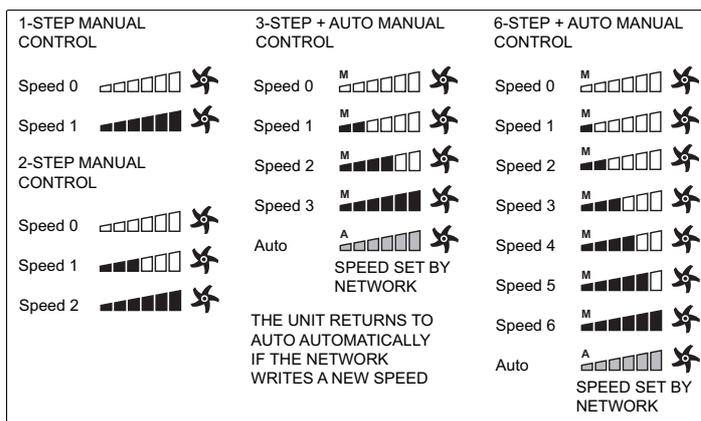
To set the fan speed (or the line bar) to a position, touch the line bar / fan icon area and the line icon (and network variable) is set according the configuration e.g. 1-step, 2-step etc. The options for the FAN MANUAL CONTROL (operating the FAN speed manually) are:-

• DISABLED (Default)
• 1-STEP; fan speed rotates between OFF and 6 segments
• 2-STEP; fan speed rotates between OFF, 3 and 6 segments
• 3-STEP; fan speed rotates between OFF, 2, 4 and 6 segments
• 6-STEP; fan speed rotates between OFF, 1, 2, 3, 4, 5 and 6 segments
• 1-STEP+AUTO; fan speed rotates between OFF (M), 6 segments (M) and Auto (A). When auto is selected, the display returns to show the speed set over the network.
• 2-STEP+AUTO; fan speed rotates between OFF (M), 3 segments (M), 6 segments (M) and Auto (A). When auto is selected, the display returns to show the speed set over the network.
• 3-STEP+AUTO; fan speed rotates between OFF (M), 2 segments (M), 4 segments (M), 6 segments (M) and Auto (A). When auto is selected, the display returns to show the speed set over the network.
• 6-STEP+AUTO; fan speed rotates between OFF (M), 1/2/3/4/5/6 segments (M) and Auto (A). When auto is selected, the display returns to show the speed set over the network.
• ADVANCED; advanced fan speed control option. See below for details.

When pressing the area again the (fan speed) line segment is set to display the next value. When the fan speed is changed manually on the screen, the fan speed network variable update is delayed shortly so that the network variable does not update at intermediate values.

ADVANCED FAN MANUAL CONTROL

When selecting the Advanced option for the Fan Manual Control, the fan speed rotates between AUTO (speed set by network) - N (night) - M1 - M2 - M3 - M4 - M5 - M6. The night speed is set by Modbus register 135. The Auto speed is set by register 111 and displays 'A' next to speed. The register 134 shows the current speed.

TRI-3A (Analogue 0-10Vdc Output) MODELS

With TRI-3A models it is possible to send the current fan speed set by the user to the analogue 0-10vdc output (1-speed: 0=0%, 1=100%; 2-speed: 0=0%, 1=50%, 2=100%; 3-speed: 0=0%, 1=33%, 2=66%, 3=100%; 6-speed: 0=0%, 1=17%, 2=33%, 3=50%, 4=66%, 5=83%, 6=100%).

When in NIGHT mode, the fan speed is set to the Fan Speed Night parameter value. When returning from night the speed goes to 100% if fan mode is set to any of the 'auto options'. If the fan mode is configured for 'non-auto options' then the fan speed returns to speed 1.

Operating Mode Icon

The interface unit has Operating Mode icon that allows the unit operating mode to be set (network variable).

By touching the icon the operating mode rotates between the below options. The number of options depend on the configuration setting.

- AUTO (AUTOMATED)
- FAN (CIRCULATION/VENTILATION)
- HTG (HEATING)
- CLG (COOLING)

As default the Mode icon is not active and it can be activated and configured in the configuration parameters. The options are:-

- DISABLED
- HTG/CLG; rotates between Heating/Cooling
- HTG/CLG/FAN; rotates between Heating/Cooling/Circulation Fan
- AUTO/HTG/CLG; rotates between Auto/Heating/Cooling
- AUTO/HTG/CLG/FAN; rotates between Auto/Heating/Cooling/Circulation Fan
- AUTO/HTG/FAN; rotates between Auto/Heating/Circulation Fan
- AUTO/CLG/FAN; rotates between Auto/Cooling/Circulation Fan

CONTROL MODE; PRESSING ICON ROTATES BETWEEN AUTO-FAN-HTG-CLG

ECO Mode Icon

The TRI can be switched to ECO display mode via network or via digital input. In the ECO display mode the ECO icon is displayed as illustrated on the drawing.

When in the ECO display mode, the ECO mode can be cancelled by pressing the ECO icon on the front screen. Last command controls the TRI state i.e if the TRI has been switched to ECO mode via a digital input or over the network, the user can cancel the mode through the touchscreen.

Note: ECO Mode Button can be disabled through configuration settings. When disabled the user cannot cancel the ECO mode.

ECO MODE STATUS AND CANCEL ICON

OFF Mode Icon

The TRI can be switched to OFF mode via the touchscreen, digital volt-free input (e.g. time clock) or via the communication network (system configuration). In the OFF mode the OFF icon is displayed in red, the target display is dimmed and up&down buttons are hidden.

OFF MODE INACTIVE

OFF MODE ACTIVE

OFF MODE CANCEL ICON

OFF MODE ICON TO ACTIVATE OFF MODE

TARGET VALUE 'DIMMED' WHEN OFF MODE ACTIVE

The OFF mode can be cancelled by pressing the OFF icon. The system is designed so that the last command controls the current state. E.g. if the TRI has been overridden to OFF mode via the network, or a digital input transition, the user can cancel the OFF mode by pressing the OFF icon. Similarly a networked interface driven to OFF mode by the user can be overridden back to COMFORT mode using the network master.

The OFF mode icon can be enabled / disabled:-

- DISABLED: Icon Not Visible (default)
- ENABLED: OFF Icon is displayed in the HOME SCREEN in the FUNCTION BASED ICON area if the PARTY MODE has not been enabled. Otherwise it is displayed in the FURTHER SETTINGS SCREEN.

Night Mode (Digital Input Override)

The TRI-3A(1R) can be switched to Night mode via the Digital Input. In the Night mode the target display is dimmed (like in OFF mode), and the Fan Speed is set as per the Fan Night Speed configuration setting.

On return from Night mode to the normal mode (opening digital input), the user setpoint is set to the Nominal Setpoint (default 21°C).

Party Mode (Boost)

The TRI interface has a PARTY MODE button. When the PARTY MODE (BOOST) TIME has been set, and the PARTY MODE icon is pressed, the PARTY MODE is activated (icon turns red).

In the PARTY MODE the device activates the interface relay (TRI-1R only) and the status is available over the network. The PARTY MODE can be cancelled by pressing the PARTY mode button.

NOTE (TRI-1R): If the relay mode has been to NETWORK, the party mode has no effect on the relay.

The PARTY MODE icon can also be activated / deactivated over the network.

PARTY ICON, PRESS TO ACTIVATE THE BOOST, TO CANCEL RE-PRESS

Room 23°C .8

CANCEL PARTY MODE WHEN ACTIVE

INDICATES THE CURRENT REMAINING PARTY MODE TIME

6 mins. Remaining
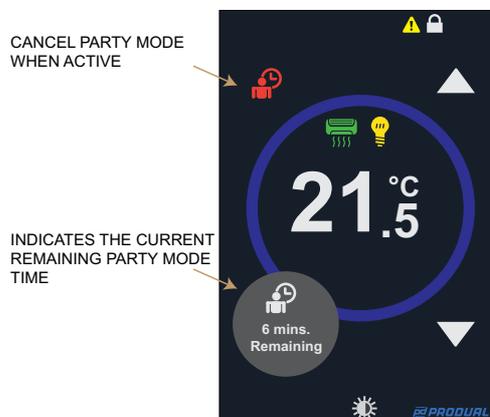
Frost Icon

Frost icon can be set via network to display frost condition (or defrosting).

Target 21°C .5

Room 20°C .1

FROST ICON

Cleaning Mode

After entering FURTHER INFORMATION screen, by selecting the CLEANING icon, it is possible to activate the cleaning mode. The TRI will enter a "Clean Screen" state where all touchscreen presses are ignored and 30 second countdown timer is displayed. This allows cleaning of the interface.

A/C and Lights Buttons

It is possible to enable A/C and LIGHTS buttons. The buttons and their current status is displayed on the front screen.

When touching the buttons, the Lights and/or AC Icon are either swithed ON or OFF. The status of the buttons is available over the network. It is also possible to override the Icons ON or OFF over the network.

The buttons are enabled through the Maintenance Mode in the Display settings.

LIGHTS STATUS, AND ON/OFF SWITCH

LIGHTS ON

LIGHTS OFF

A/C STATUS, AND ON/OFF SWITCH

A/C ON

A/C OFF
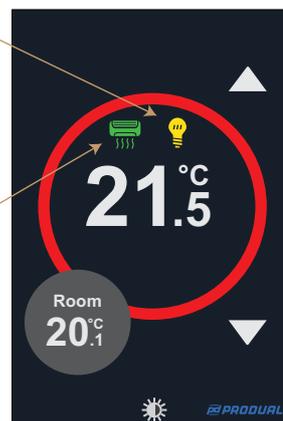
Energy Ring Display

The TRI has a large ring around the target temperature ("energy ring"). The ring colour can be set from the network, or it can automatically change density between red-grey-blue by calculating the difference between the target and sensor 1/2/3 temperature.

The ring colour has the following options:- .

> 0 = White
> 1 = Red
> 2 = Blue
> 3 = Green
> 4 = Orange
> 5 = Yellow
> 6 = Magenta
> 7 = Cyan
> 8 = Sensor 1
> 9 = Sensor 2
> 10 = Sensor 3 (Default)

RING COLOUR ADJUSTABLE OVER NETWORK

WHITE   RED   BLUE   GREEN

ORANGE   YELLOW   MAGENTA   CYAN
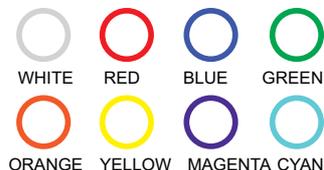
Lock Mode

After entering FURTHER INFORMATION screen, by selecting the LOCK icon it is possible to lock the user interface. Now by entering the LOCK CODE (default 0000), the TRI lock state can be activated.

The lock mode can be configured to work in different ways:-

- DISABLED: Lock Mode Icon Not Available
- ADJUST ONLY: Allows Temporary Temperature Adjustment Only
- SCHEDULES ONLY: Allows adjustment of the Programmed Times
- NO INPUT: All Buttons Locked
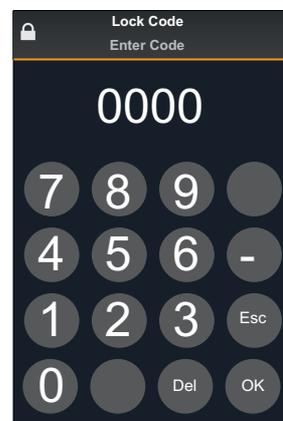
Lock Mode Options	Icon Active							
	Lock	**Up and Down/ FAN**	**PARTY MODE / OFF**	**ECO**	**AC**	**Lights**	**Programs (TRI-P Only)**	**Cleaning/ Clock (TRI-P Only)**
DISABLED	NO	YES	YES	YES	YES	YES	YES	YES
ON/OFF ONLY	YES	NO	YES	NO	YES	YES	NO	YES
ADJUST ONLY	YES	YES	NO	NO	NO	NO	NO	YES
NO INPUT	YES	NO	NO	NO	NO	NO	NO	YES

Alarm Display

When entering FURTHER INFORMATION AND SETTINGS screen and an alarm is active, select the alarm icon for more information.

The typical alarm reasons are:

- External sensor 1 (Res1) fault (when activated; not connected)
- External sensor 2 (Res2) fault (when activated; not connected)
- Built-in sensor fault
- Digital Contact Fault
- Time Lost (TRI-P-1R only)

Note: If the sensor source has been set to *Network* then the alarm is inhibited.

FURTHER SETTINGS AND INFORMATION
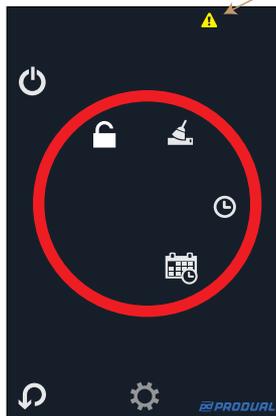
SELECT ALARM ICON FOR MORE INFORMATION
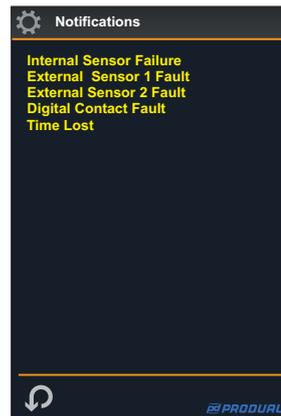
External Sensor RI1 and RI2 Inputs

A remote NTC10k3 sensor can be connected to the RI1 and RI2 input and used for the monitoring purposes. The measurement is always available over the communications network in MOD/BAC models. If configured the reading is also showed on the display in the SMALL ACTION CIRCLE area.

With TRI-3A models the temperature readings can be sent to analogue Y1/Y2/Y3 0-10Vdc outputs.

DI1 Digital Volt-Free Input

The digital volt-free contact can be used to override the interface to ECO and OFF/FROST modes, or for just monitoring purposed. The configuration options are:-

- Close for ECO Mode
- Open for ECO Mode
- Close for OFF Mode
- Open for OFF Mode
- Alarm
- Network
- Close for Night
- Disabled

"Close For" Configuration - The digital volt-free contact can be linked to e.g. external timer to switch the user interface to OFF or ECO mode (input delay timer).

"Open For" Configuration - The digital volt-free input can be used to activate ECO or OFF mode when the contact opens. In this mode it can be connected to a window switch or door card switch.

Alarm Configuration - when the contact closes the "DI Contact Alarm" alarm message is displayed on the screen.

Network option is selected when the digital input is used for monitoring purposes only.

Close for Night - when the contact closes the device goes to NIGHT MODE, where the user setpoint is greyed out, the fan speed is set to a predetermined value, and where on return the fan speed goes to Auto and the setpoint resets to Nominal setpoin.

Analogue 0-10Vdc Outputs (TRI-3A Models only)

The TRI-3A models have 3 x 0..10Vdc Y1/Y2/Y3 analogue outputs. The configuration options for outputs are:-

- Setpoint; current setpoint is scaled over 0..10Vdc between Min/Max Setpoint Adjustments
- CO2 (option); the CO2 reading is scaled over 0..10Vdc (0..5,000ppm)
- Humidity (option); the humidity measurement is scaled over 0..10Vdc (0..100%rH)
- Sensor1 (RI1); RI1 reading is scaled over 0..10Vdc (0..50°C = 0..100.0%)
- Sensor2 (RI2); RI2 reading is scaled over 0..10Vdc (0..50°C = 0..100.0%)
- Sensor3 (Built-In Sensor); Built-In Sensor Reading is scaled over 0..10Vdc (0..50°C = 0..100.0%)
- Fan Speed; thecurrent selected Fan Speed is scaled over 0..10Vdc (1-speed: 0=0%, 1=100%; 2-speed: 0=0%, 1=50%, 2=100%; 3-speed: 0=0%, 1=33%, 2=66%, 3=100%; 6-speed: 0=0%, 1=17%, 2=33%, 3=50%, 4=66%, 5=83%, 6=100%)

Humidity Measurement (-RH option)	The models with RH option have a 2%rH accurate humidity sensor for room space humidity measurement. The humidity reading is displayed inside the SMALL ACTION CIRCLE (display as default enabled, option to disable through configuration pages).

With MOD/BAC models the humidity reading is available over the communication network as a network variable.

With TRI-3A models the humidity measurement can be sent to any of the analogue 0-10Vdc outputs (Y1/Y2/Y3). |
| **CO2 Measurement (-CO2 Option)** | The models with CO2 option can monitor and measure the CO2 (Carbon Dioxide) levels. The measured CO2 is shown on the display in the SMALL ACTION RING. The CO2 display can be disabled in the Maintenance Mode if required.

With MOD/BAC-models the CO2 reading is available as a network variable.

With TRI-3A models the CO2 reading can be sent to the analogue Y1/Y2/Y3 outputs. The reading is scaled over 0..5,000ppm. |
| **Touchscreen Calibration** | The touchscreen can be re-calibrated by pressing the screen on power-up, or when returning from the System Maintence Screen pressing the screen during the reboot. Calibrate the screen by swiping to the all four edges of the screen and then press OK to accept the new settings. |
| **Programming Schedule (TRI-P-1R Only)** | The TRI-P-1R user interfaces have up to five programmable time switching times. Each switching time can be configured to switch the *Time Channel* network variable On/Off. The times can be set for individual weekdays or can be switched 5+2 mode where the targets are set for WEEKDAYS or WEEKENDS as a group.

The SCHEDULE OVERVIEW screen shows the current ON and OFF switching periods. By selecting the day it is possible to adjust the switching times and On/Off setting.

NOTE: Switching from the 7 DAYS mode to 5+2 DAYS mode will set all weekday/weekend to the group settings. When returning back to 7 DAYS mode the setting are required to be re-entered for each day. A copy function is available to copy times and target temperatures from one day (or group) to other day. |

SETTING PROGRAM SCHEDULES

Language Selection	The TRI-1R user pages can be displayed in different languages by selecting the language from the System Configuration pages.
Configuration Parameters	

The TRI user interfaces are configured to operate in different modes via the configuration parameters accessible through the maintenance mode.

To enter the maintenance mode click the COG WHEEL icon in the FURTHER SETTINGS SCREEN and enter the maintenance mode password (default 6666).

Note: The maintenance mode password can be changed in the configuration settings. Make sure that you note the new password if changed.

CONTROL SETTINGS

Parameter Name	Description	Range
Nominal Setpoint	Nominal Setpoint	0.0...99.9°C/°F/% (Default 21.0°C)
Setpoint Limit Mode	Setpoint Limit Mode	0 = Absolute (Default) 1 = Relative
Min Setpoint Adj	Absolute Mode: Minimum Adjustable Setpoint Relative Mode: Minimum Setpoint Deviation from Nominal Setpoint	0.0...99.9°C/°F/% (Default 14.0)
Max Setpoint Adj	Absolute Mode: Maximum Adjustable Setpoint Relative Mode: Maximum Setpoint Deviation from Nominal Setpoint	0.0...99.9°C/°F/% (Default 30.0)

INPUTS & OUTPUTS

Parameter Name	Description	Range
Sensor 1 Source	Sensor 1 Source. When set to Hardware reads RI1. (status monitoring over the network is always active)	0 = Hardware (RI1) 1 = Network (Default)
Sensor 2 Source	Sensor 2 Source. When set to Hardware reads RI2. (status monitoring over the network is always active)	0 = Hardware (RI1) 1 = Network (Default)
Sensor 3 Source	Sensor 3 Source. When set to Hardware reads the internal temperature sensor. (status monitoring over the network is always active)	0 = Hardware (Built-In Sensor) - Default 1 = Network
Digital Input Mode	Digital Input Operation (status monitoring over the network is active for all modes)	0 = Disabled (no TRI effect) 1 = Close for ECO 2 = Open for ECO 3 = Close for OFF 4 = Open for OFF 5 = DI Contact Alarm 6 = Network 7 = Close for Night 8 = Disabled
Digital Input Delay	Digital Input Delay Timer (transition from active to non-active)	0..7200 seconds (Default 0s)
Internal Sensor Cal	Internal Sensor One Point Compensation	-10.0..+10.0 °C/°F
RI1 Cal	Sensor Connected to RI1 Calibration	-10.0..+10.0 °C/°F
RI2 Cal	Sensor Connected to RI2 Calibration	-10.0..+10.0 °C/°F
Humidity Cal	Humidity Calibration	-10.0..+10.0 % rH
CO2 Cal.	CO2 Sensor Calibration (CO2 Models)	-500...+500 ppm
Y1 Mode (TRI-3A Only)	Analogue Output Y1 Mode Default: Fan	0 = Network 1 = Sensor1 (RI1) 2 = Sensor2 (RI2) 3 = Sensor3 (Built-In) 4 = Setpoint 5 = Fan 6 = Humidity 7 = CO2
Y2 Mode (TRI-3A Only)	Analogue Output Y2 Mode Default: Setpoint	
Y3 Mode (TRI-1R Only)	Analogue Output Y3 Mode Default: Sensor3 (Bult-In Sensor)	
Fan Night Speed	Fan Speed at Night (OFF Mode)	0..6 (Default 0)

OPERATING MODES

Parameter Name	Description	Range
Lock Mode	Lock Operation	0 = Disabled (default) 1 = On/Off/Boost Workable Only 2 = Temp Adjust Only Available 3 = No Input - All Buttons Disabled
Lock Code	Lock Mode Password	0000 - 9999 (default 0000)

OPERATING MODES

Parameter Name	Description	Range
Relay Mode (TRI-1R Only)	Select Relay Operation Control NO/NC = linked to the schedule, and party mode timed override Network = Controlled via Network	0 = Control Normally Open (Default) 1 = Control Normally Closed 2 = Network
Fan Manual Control	Enables the Fan Icon and Line Bar Icon manual Setting	0 = Disabled (default) 1 = 1-Step 2 = 2-Step 3 = 3-Step 4 = 6-Step 5 = 1-Step +Auto 6 = 2-Step + Auto 7 = 3-Step + Auto 8 = 6-Step + Auto 9 = Advanced
Party Mode (Boost) Time	Boost Mode Running Time	0..480 minutes (Default 0) 0 = Disabled
Ring Colour	Set the Main Ring Colour	0 = White 1 = Red 2 = Blue 3 = Green 4 = Orange 5 = Yellow 6 = Magenta 7 = Cyan 8 = Sensor 1 9 = Sensor 2 10 = Sensor 3 (Default)

DISPLAY

Parameter Name	Description	Range
Brightness	Backlight Brightness	0..20 (default 5)
Enable Lights	Enable Lights Icon / Network Variable	0 = Disabled (default) 1 = Enabled
Enable AC	Enable AC Icon / Network Variable	0 = Disabled (default) 1 = Enabled
Fan Speed Display	Enable Fan Speed Display and Line Bar Icon Display	0 = Disabled (default) 1 = Bar + Fan 2 = Bar Only 3 = Fan Only 4 = Coloured Bar + Fan 5 = Coloured Bar
Mode Icon	Enable Mode Icons and Variables	0 = Disabled (default) 1 = Htg/Clg 2 = Htg/Clg/Fan 3 = Auto/Htg/Clg 4 = Auto/Hhg/Clg/Fan 5 = Auto/Htg/Fan 6 = Auto/Clg/Fan
OFF Icon	Enable OFF Icon	0 = Disabled (default) 1 = Enabled
Humidity Display	Enable / Disable Humidity Display (if option fitted)	0 = Disabled 1 = Enabled (default)
CO2 Display	Enable / Disable CO2 Display (if option fitted)	0 = Disabled 1 = Enabled (default)
Show Unit Swap	Centigrade to Fahrenheit Temperature Mode Selection on the Home Screen	0 = Disabled (default) 1 = Enabled

DISPLAY		
Parameter Name	**Description**	**Range**
Sensor 1 Text	Description for the Sensor1 (RI1/Network) Default; 0 = Disabled Note: Disabled removes Sensor1 Text and Measurement from Display	0 = Disabled 1 = Room 2 = Floor 3 = Outside 4 = Zone 1 5 = Zone 2 6 = Zone 3 7 = Bathroom 8 = Sauna 9 = Bedroom 10 = Kitchen 11 = Cooler 12 = Flow 13 = Hot Water 14 = Tank 15 = Pool 16= Cabin
Sensor 2 Text	Description for the Sensor2 (RI2/Network) Default; 0 = Disabled Note: Disabled removes Sensor1 Text and Measurement from Display	
Sensor 3 Text	Description for the Sensor3 (Built-In Sensor/Network) Default; 1 = Room Note: Disabled removes Sensor1 Text and Measurement from Display	
Setpoint Mode	Sets the unit of the target parameter	0 = Temperature (default) 1 = Percentage 2 = None (no setpoint displayed)
Disable ECO Button	Disables the user cancel of the ECO mode	0 = Enabled (default) 1 = Disabled

SYSTEM		
Parameter Name	**Description**	**Range**
Address	Modbus Address (Only Modbus versions) BACnet MAC Address (Only BACnet versions)	0..247 (Default 1) 0..127 (Default 1)
Baud Rate	Modbus / BACnet Baud Rate	0 = 9600 (Default) 1 = 19200 2 = 38400 3 = 57600 4 = 76800 5 = 115200
Parity	Parity	0 = None (Default) 1 = Odd 2 = Even
Stop Bits	Stop Bits	0 = 1 Stop Bit (Default) 1 = 2 Stop Bits
Device ID (Only BACnet versions)	BACnet Device ID	0..4,194,303 (Default Auto=651001)
Service Pin (Only BACnet versions)	Bacnet Service Pin (when activated the device sends BACnet I-AM message)	0 = Disabled (default) 1 = Enabled
Maintenance Code	Maintenance Mode Password	0000 - 9999 (default 6666)
Staff Code	Staff Page Password - Access Password to Further Settings Screen	0000 - 9999 (default 0000 = disabled)
Language	Default Language for User Screens	0 = English (Default) 1 = Finnish 2 = Swedish
Screen Refresh Rate	Refresh Rate of the LCD Screen	0 = Fast (default) 1 = Medium 2 = Slow
Native Units (Defaults)	Selects either Fahrenheit / Celsius as Native Units NOTE: RELOADS DEFAULTS	C = Celsius (default) F = Fahrenheit
Reload Default	Reload Factory Default Settings	0 = Off (default) 1 = On
Version	Software Version	x.xx (Modbus/BACnet)

NOTE: If the communication settings have been changed they are activated upon exiting the Maintenance Mode - the device carries out a soft reset. Alternatively power cycle will activate the new communication settings.

Parameter Storage The configuration parameters are stored in the non-volatile memory. When the changes are carried out via the display, the parameters are stored in the non-volatile memory when the controller returns to a normal display mode. If the changes are carried out over the network (Modbus), then "NonVol Update" flag is required to be forced on to save the changes. When configured via the display, when the parameters are stored after the timeout or exit button.

Modbus Registers The controller supports the following Modbus registers and function codes. The default communication speed is 9600 bps, 8 data bits, Parity None and 1 Stop Bit. The default Modbus Slave address is 1. The device Parity can be changed between Odd, None and Even. The baud rate is selectable between 9600, 19200, 38400, 57600 and 76800 bps. The table shows the register offsets starting from 0 (0 Base) register address. For example, the Temperature is read from Modbus register 100 using Function Code 04. Some Modbus masters will require one to be added to Modbus registers (i.e. 1 Base). In this case Function Code 04, register 101 needs to be entered.

Register	Parameter Description	Data Type	Raw Data	Range
	FUNCTION CODE 01 - READ COILS **FUNCTION CODE 05 - WRITE SINGLE COIL** **FUNCTION CODE 15 - WRITE MULTIPLE COILS**			
100	Off Mode Override (last transition commands)		0..1	Off - On
101	ECO Mode Override (last transition commands)		0..1	Off - On
102	Show Frost Icon		0..1	Off - On
103	Boost Override (Override Boost Icon)		0..1	Off - On
	FUNCTION CODE 02 - READ DISCRETE INPUTS (Add 10,000 for Modicon Addressing)			
100	Digital Input Status		0..1	Off - On
101	Relay Output Status		0..1	Off - On
102	Time Clock Status (TRI-P-1R Only)		0..1	Off - On
103	Light Switch Status		0..1	Off - On
104	A/C Switch Status		0..1	Off - On
105	OFF Mode Status		0..1	Off - On
106	Screen Lock Status		0..1	Off - On
107	Party Mode (Boost) Status		0..1	Off - On
108	ECO Mode Status		0..1	Off - On
109	Low Battery/Time Lost (TRI-P-1R Only)		0..1	Off - On
110	Auto Fan Status (fan in auto mode)		0..1	Off - On
	FUNCTION CODE 04 - READ INPUT REGISTERS (Add 30,000 for Modicon Addressing)			
100	Built-In Temperature Measurement	Signed 16	-400...3020	-40.0...150.0°C (-40.0..302.0°F)
101	Resistive Input 1 Measurement	Signed 16	-400...3020	-40.0...150.0°C (-40.0..302.0°F)
102	Resistive Input 2 Measurement	Signed 16	-400...3020	-40.0...150.0°C (-40.0..302.0°F)
103	Current Calculated Setpoint (°C)	Signed 16	-400...3020	-40.0...150.0°C (-40.0..302.0°F)
104	Interface Current Mode	Unsigned 16	0..3	0 = Comfort 1 = OFF 2 = Party (Boost) Mode
105	Relative Humidity Measurement (with RH option)	Unsigned 16	0..1000	0..100.0 %rH
106	Alarm State	Unsigned 16	0..256	Bit 0 - Internal NTC (1) Bit 1 - RI1 (2) Bit 2 - RI2 (4) Bit 3 - Humidity Sensor (8) Bit 4 - DI1 (16) Bit 5 - DI2 (Not Applicable) Bit 6 - Time Lost (64)
107	Discrete Input Registers (Bit 0 = DI1, Bit1 = Relay, Bit 2 = Holiday etc.)	Unsigned 16	0..65,535	N/A
108	Next Schedule Switching Time (only TRI-P-1R)	Unsigned 16	0..2400	0..2400
109	Next Schedule Switching Day (only TRI-P-1R)	Unsigned 16	0..6	0..6
110	Next Schedule Switching Value (only TRI-P-1R)	Unsigned 16	0..1	0..1
111	Current Fan Speed	Unsigned 16	0..6	0..6

Register	Parameter Description	Data Type	Raw Data	Range
112	Mode Icon Status	Unsigned 16	0..3	0 = Auto 1 = Heating 2 = Cooling 3 = Ventilation Fan
113	CO2 Measurement	Unsigned 16	0..5000	0..5,000 ppm
200	Firmware Version	Unsigned 16	N/A	N/A
	FUNCTION CODE 03 - READ HOLDING REGISTERS (For Modicon Addressing Add 40,000) **FUNCTION CODE 06 - WRITE SINGLE HOLDING REGISTER** **FUNCTION CODE 16 - WRITE MULTIPLE HOLDING REGISTERS**			
100	Nominal Setpoint	Unsigned 16	0...990	0...99.9 (Default 21.0) (°C/°F/%)
101	Setpoint Unit	Unsigned 16	0..2	0 = Temperature (Default) 1 = Percentage 2 = None
102	Sensor 3 Source	Unsigned 16	0..1	0 = Buillt-In Sensor (Default) 1 = Network Sensor
103	Sensor 3 Network Temperature	Signed 16	-580...1220	-58.0...122.0°C/°F (Default 0.0)
104	Minimum Setpoint	Unsigned 16	0...990	0.0...99.9°C/°F/% (Default 14°C)
105	Maximum Setpoint	Unsigned 16	0...990	0.0...99.9°C/°F/% (Default 30°C)
106	Colour Ring Mode	Unsigned 16	0..10	0 = White 1 = Red 2 = Blue 3 = Green 4 = Orange 5 = Yellow 6 = Magenta 7 = Cyan 8 = Sensor 1 9 = Sensor 2 10 = Sensor 3 (Default)
107	Sensor 1 Source	Unsigned 16	0..1	0 = RI1 1 = Network Sensor (Default)
108	Sensor 1 Network Temperature	Signed 16	-580...1220	-58.0...122.0°C/°F (Default 0.0)
109	Fan Manual Control Mode	Unsigned 16	0..4	0 = Disabled (default) 1 = 1-Step 2 = 2-Step 3 = 3-Step 4 = 6-Step 5 = 1-Step + Auto 6 = 2-Step + Auto 7 = 3-Step + Auto 8 = 6-Step + Auto 9 = Advanced
110	Fan Display	Unsigned 16	0..5	0 = Disabled (default) 1 = Bar & Fan 2 = Bar 3 = Fan 4 = Coloured Bar & Fan 5 = Coloured Bar
111	Fan Speed Override	Unsigned 16	0..6	0..6
112	Enable Mode Icon	Unsigned 16	0..6	0 = Disabled (default) 1 = Htg/Clg 2 = Htg/Clg/Fan 3 = Auto/Htg/Clg 4 = Auto/Hhg/Clg/Fan 5 = Auto/Htg/Fan 6 = Auto/Clg/Fan
113	Digital Input Mode	Unsigned 16	0..8	0 = Disabled (no TRI effect) 1 = Close for ECO 2 = Open for ECO 3 = Close for OFF 4 = Open for OFF 5 = DI Contact Alarm 6 = Network 7 = Close for Night

Register	Parameter Description	Data Type	Raw Data	Range
114	Digital Input Delay	Unsigned 16	0..7200	0..7200 seconds (Default 0s)
115	Enable Lights Symbol	Unsigned 16	0..1	0 = Disabled (default) 1 = Enabled
116	Enable AC Symbol	Unsigned 16	0..1	0 = Disabled (default) 1 = Enabled
117	Lock Mode	Unsigned 16	0..3	0 = Lock mode disabled (default) 1 = On/Off/Boost workable only 2 = Temp settings only available 3 = All buttons disabled
118	Show Temperature Unit Selection Icon	Unsigned 16	0..1	0 = Disabled (default) 1 = Enabled
119	Built-In Sensor Calibration	Signed 16	-100..+100	-10.0..+10.0 °C/°F
120	RI1 Sensor Calibration	Signed 16	-100..+100	-10.0..+10.0 °C/°F
121	RI2 Sensor Calibration	Signed 16	-100..+100	-10.0..+10.0 °C/°F
122	Humidity Sensor Calibration	Signed 16	-100..+100	-10.0..+10.0 %rH
123	Humidity Display	Unsigned 16	0..1	0 = Disabled 1 = Enabled (default)
124	Override Mode Icon Note: To release override set to None, otherwise the user cannot set/unset.	Unsigned 16	0..4	0 = None (Default) 1= Auto 2 = Heating 3 = Cooling 4 = Ventilation
125	Party Mode (Boost) Time	Unsigned 16	0...480	0..480 minutes (Default 0) 0 = Disabled
126	Backlight Brightness	Unsigned 16	0..20	0..20 (default 5)
127	Relay Control Mode Control = Controlled by the time schedule / party mode boost Network = Controlled by network.	Unsigned 16	0..1	0 = Control Normally Open (Default) 1 = Control Normally Closed 2 = Network
128	Lock Mode Password	Unsigned 16	0..9999	0000...9999
129	Maintenance Mode Password	Unsigned 16	0..9999	0000...9999
130	Override A/C Note: To release override set to None, otherwise the user cannot set/unset.	Unsigned 16	0..2	0 = None (default) 1 = Override On 2 = Override Off
131	Override Lights Note: To release override set to None, otherwise the user cannot set/unset	Unsigned 16	0..2	0 = None (default) 1 = Override On 2 = Override Off
132	Override Lock Mode Note: The parameter returns automatically to 0 allowing local control.	Unsigned 16	0..2	0 = None (default) 1 = Lock Screen 2 = Cancel Lock Mode
133	Enable OFF Icon	Unsigned 16	0..1	0 = Disabled (Default) 1 = Enabled (Home Screen)
134	Fan Speed Override (Advanced Mode)	Unsigned 16	1..8	1 = Register 135 2 = Speed 1 3 = Speed 2 4 = Speed 3 5 = Speed 4 6 = Speed 5 7 = Speed 6 8 = Register 111
135	Night Speed - Set Fan Speed in Night Mode	Unsigned 16	0..6	0..6
136	Relay Network Override (Overrides the relay drive directly, local)	Unsigned 16	0..2	0 = No Override (Default) 1 = Override Relay On 2 = Override Relay Off
137	Staff Code	Unsigned 16	0..9999	0000...9999
138	Language	Unsigned 16	0..2	0 = English (Default) 1 = Finnish 2 = Swedish

Register	Parameter Description	Data Type	Raw Data	Range
139	Sensor 1 Text (RI1/Network) Default 0 = Disabled Note: Disabled removes the text and measurement from the display.	Unsigned 16	0..16	0 = Disabled 1 = Room 2 = Floor 3 = Outside
140	Sensor 2 Text (RI2/Network) Default: 0 = Disabled Note: Disabled removes the text and measurement from the display.	Unsigned 16	0..15	4 = Zone 1 5 = Zone 2 6 = Zone 3 7 = Bathroom 8 = Sauna
141	Sensor 3 Text (Built-in / Network Sensor) Default: 1 = Room Note: Disabled removes the text and measurement from the display.	Unsigned 16	0..15	9 = Bedroom 10 = Kitchen 11 = Cooler 12 = Flow 13 = Hot Water 14 = Tank 15 = Pool 16 = Cabin
142	Sensor 2 Source	Unsigned 16	0..1	0 = RI1 1 = Network Sensor (Default)
143	Sensor 2 Network Temperature	Signed 16	-580...1220	-58.0...122.0°C/°F (Default 0.0)
159	Disable ECO Button User Cancel	Signed 16	0..1	0 = Enabled (Default) 1 = Disabled
REGISTERS 144 TO 154 ARE FOR TRI-P-1R/TRI-3A ONLY				
144	Current Hour (P-version)	Unsigned 16	0..23	0..23
145	Current Minute (P-version)	Unsigned 16	0..59	0..59
146	Current Day (P-version)	Unsigned 16	1..31	1..31
147	Current Month (P-version)	Unsigned 16	1..12	1..12
148	Current Year (P-version)	Unsigned 16	2015..2099	2015..2099
149	Current Hour Update Register (P-version)	Unsigned 16	0..23	0..23
150	Current Minute Update Register (P-version)	Unsigned 16	0..59	0..59
151	Current Day Update Register (P-version)	Unsigned 16	1..31	1..31
152	Current Month Update Register (P-version)	Unsigned 16	1..12	1..12
153	Current Year Update Register (P-version)	Unsigned 16	2015..2099	2015..2099
154	Update Time (P-version)	Unsigned 16	0..1	0 = No Action 1 = Update
160	CO2 Calibration	Signed 16	-500..+500	-500...+500 ppm
161	Y1 Output Mode Default: Fan	Unsigned 16	0..7	0 = Network 1 = Sensor1 (RI1)
162	Y2 Output Mode Default: Setpoint	Unsigned 16	0..7	2 = Sensor2 (RI2) 3 = Sensor3 (Built-In)
163	Y3 Output Mode Default: Sensor2 (Built-in)	Unsigned 16	0..7	4 = Setpoint 5 = Fan 6 = Humidity 7 = CO2
164	Analogue Output Y1 Override Value	Unsigned 16	0..1000	0..100% (0..10.0V) - Default 0
165	Analogue Output Y2 Override Value	Unsigned 16	0..1000	0..100% (0..10.0V) - Default 0
166	Analogue Output Y3 Override Value	Unsigned 16	0..1000	0..100% (0..10.0V) - Default 0
167	Display CO2	Signed 16	0..1	0 = Enabled (Default) 1 = Disabled
168	Setpoint Limit Mode	Signed 16	0..1	0 = Absolute (Default) 1 = Relative
REGISTERS 200 TO 269 ARE FOR TRI-P-1R/TRI-3A ONLY				
200	Monday / Weekday Switching Time 1	Unsigned 16	0..2400	0..2400 (Default 0600)
201	Monday / Weekday Switching Time 2	Unsigned 16	0..2400	0..2400 (Default 1000)
202	Monday / Weekday Switching Time 3	Unsigned 16	0..2400	0..2400 (Default 1300)
203	Monday / Weekday Switching Time 4	Unsigned 16	0..2400	0..2400 (Default 1700)
204	Monday / Weekday Switching Time 5	Unsigned 16	0..2400	0..2400 (Default 2200)
205	Monday Switching Time 1 Target	Unsigned 16	0..1	0..1 (Default 0)
206	Monday Switching Time 2 Target	Unsigned 16	0..1	0..1 (Default 0)
207	Monday Switching Time 3 Target	Unsigned 16	0..1	0..1 (Default 0)

Register	Parameter Description	Data Type	Raw Data	Range
208	Monday Switching Time 4 Target	Unsigned 16	0..1	0..1 (Default 0)
209	Monday Switching Time 5 Target	Unsigned 16	0..1	0..1 (Default 0)
210	Tuesday / Weekend Switching Time 1	Unsigned 16	0..2400	0..2400 (Default 0600)
211	Tuesday / Weekend Switching Time 2	Unsigned 16	0..2400	0..2400 (Default 1000)
212	Tuesday / Weekend Switching Time 3	Unsigned 16	0..2400	0..2400 (Default 1300)
213	Tuesday / Weekend Switching Time 4	Unsigned 16	0..2400	0..2400 (Default 1700)
214	Tuesday / Weekday Switching Time 5	Unsigned 16	0..2400	0..2400 (Default 2200)
215	Tuesday Switching Time 1 Target	Unsigned 16	0..1	0..1 (Default 0)
216	Tuesday Switching Time 2 Target	Unsigned 16	0..1	0..1 (Default 0)
217	Tuesday Switching Time 3 Target	Unsigned 16	0..1	0..1 (Default 0)
218	Tuesday Switching Time 4 Target	Unsigned 16	0..1	0..1 (Default 0)
219	Tuesday Switching Time 5 Target	Unsigned 16	0..1	0..1 (Default 0)
220	Wednesday Switching Time 1	Unsigned 16	0..2400	0..2400 (Default 0600)
221	Wednesday Switching Time 2	Unsigned 16	0..2400	0..2400 (Default 1000)
222	Wednesday Switching Time 3	Unsigned 16	0..2400	0..2400 (Default 1300)
223	Wednesday Switching Time 4	Unsigned 16	0..2400	0..2400 (Default 1700)
224	Wednesday Switching Time 5	Unsigned 16	0..2400	0..2400 (Default 2200)
225	Wednesday Switching Time 1 Target	Unsigned 16	0..1	0..1 (Default 0)
226	Wednesday Switching Time 2 Target	Unsigned 16	0..1	0..1 (Default 0)
227	Wednesday Switching Time 3 Target	Unsigned 16	0..1	0..1 (Default 0)
228	Wednesday Switching Time 4 Target	Unsigned 16	0..1	0..1 (Default 0)
229	Wednesday Switching Time 5 Target	Unsigned 16	0..1	0..1 (Default 0)
230	Thursday Switching Time 1	Unsigned 16	0..2400	0..2400 (Default 0600)
231	Thursday Switching Time 2	Unsigned 16	0..2400	0..2400 (Default 1000)
232	Thursday Switching Time 3	Unsigned 16	0..2400	0..2400 (Default 1300)
233	Thursday Switching Time 4	Unsigned 16	0..2400	0..2400 (Default 1700)
234	Thursday Switching Time 5	Unsigned 16	0..2400	0..2400 (Default 2200)
235	Thursday Switching Time 1 Target	Unsigned 16	0..1	0..1 (Default 0)
236	Thursday Switching Time 2 Target	Unsigned 16	0..1	0..1 (Default 0)
237	Thursday Switching Time 3 Target	Unsigned 16	0..1	0..1 (Default 0)
238	Thursday Switching Time 4 Target	Unsigned 16	0..1	0..1 (Default 0)
239	Thursday Switching Time 5 Target	Unsigned 16	0..1	0..1 (Default 0)
240	Friday Switching Time 1	Unsigned 16	0..2400	0..2400 (Default 0600)
241	Friday Switching Time 2	Unsigned 16	0..2400	0..2400 (Default 1000)
242	Friday Switching Time 3	Unsigned 16	0..2400	0..2400 (Default 1300)
243	Friday Switching Time 4	Unsigned 16	0..2400	0..2400 (Default 1700)
244	Friday Switching Time 4	Unsigned 16	0..2400	0..2400 (Default 1700)
245	Friday Switching Time 1 Target	Unsigned 16	0..1	0..1 (Default 0)
246	Friday Switching Time 2 Target	Unsigned 16	0..1	0..1 (Default 0)
247	Friday Switching Time 3 Target	Unsigned 16	0..1	0..1 (Default 0)
248	Friday Switching Time 4 Target	Unsigned 16	0..1	0..1 (Default 0)
249	Friday Switching Time 5 Target	Unsigned 16	0..1	0..1 (Default 0)
250	Saturday Switching Time 1	Unsigned 16	0..2400	0..2400 (Default 0600)
251	Saturday Switching Time 2	Unsigned 16	0..2400	0..2400 (Default 1000)
252	Saturday Switching Time 3	Unsigned 16	0..2400	0..2400 (Default 1300)
253	Saturday Switching Time 4	Unsigned 16	0..2400	0..2400 (Default 1700)
254	Saturday Switching Time 4	Unsigned 16	0..2400	0..2400 (Default 1700)
255	Saturday Switching Time 1 Target	Unsigned 16	0..1	0..1 (Default 0)
256	Saturday Switching Time 2 Target	Unsigned 16	0..1	0..1 (Default 0)
257	Saturday Switching Time 3 Target	Unsigned 16	0..1	0..1 (Default 0)
258	Saturday Switching Time 4 Target	Unsigned 16	0..1	0..1 (Default 0)

Register	Parameter Description	Data Type	Raw Data	Range
259	Saturday Switching Time 5 Target	Unsigned 16	0..1	0..1 (Default 0)
260	Sunday Switching Time 1	Unsigned 16	0..2400	0..2400 (Default 0600)
261	Sunday Switching Time 2	Unsigned 16	0..2400	0..2400 (Default 1000)
262	Sunday Switching Time 3	Unsigned 16	0..2400	0..2400 (Default 1300)
263	Sunday Switching Time 4	Unsigned 16	0..2400	0..2400 (Default 1700)
264	Sunday Switching Time 4	Unsigned 16	0..2400	0..2400 (Default 1700)
265	Sunday Switching Time 1 Target	Unsigned 16	0..1	0..1 (Default 0)
266	Sunday Switching Time 2 Target	Unsigned 16	0..1	0..1 (Default 0)
267	Sunday Switching Time 3 Target	Unsigned 16	0..1	0..1 (Default 0)
268	Sunday Switching Time 4 Target	Unsigned 16	0..1	0..1 (Default 0)
269	Sunday Switching Time 5 Target	Unsigned 16	0..1	0..1 (Default 0)
300	Modbus Address	Unsigned 16	0..247	0..247 (Default 1)
301	Modbus Baud Rate	Unsigned 16	0..5	0 = 9600 (Default) 1 = 19200 2 = 38400 3 = 57600 4 = 76800 5 = 115200
302	Modbus Parity	Unsigned 16	0..2	0 = None (Default) 1 = Odd 2 = Even
303	Stop Bits	Unsigned 16	0...1	0 = 1 Stop Bit (Default) 1 = 2 Stop Bits
304	Screen Refresh Rate	Unsigned 16	0..2	0 = Fast (Default) 1 = Medium 2 = Slow
400	Force Reset	Unsigned 16	0..1	0 = Normal 1 = Force Reset
401	Non Volatile Memory Update	Unsigned 16	0..1	0 = Normal 1 = Update
403	Force Factory Defaults	Unsigned 16	0..1	0 = Normal 1 = Force Factory Defaults

BACnet Interoperability Building Blocks Supported (Annex K)

Application Service	Initiate	Execute	BIBB
ReadProperty		Yes	DS-RP-B
ReadPropertyMultiple		Yes	DS-RPM-B
WriteProperty		Yes	DS-WP-B
ReinitializeDevice		Yes	
Who-Is		Yes	DM-DDB-B
I-Am	Yes		
Who-Has		Yes	DM-DOB-B
I-Have	Yes		
DeviceCommunicationControl		Yes	DM-DCC-B
TimeSynhronisation		Yes	DM-TS-B

BACnet Standard Object Types Supported

No dynamic Creation or Deletion supported. Objects, and object instances, are assigned to fixed functions within the proTRIetary control application of the product as follows

Object	Number Of Instances	Instance Assignments
Device Object	1	

Object	Number Of Instances	Instance Assignments
Analog Input	6	AI(0) – Sensor 3 (Built-In Sensor) AI(1) - Setpoint (Calculated) AI(2) - Humidity Measurement AI(3) – Sensor 1 (RI1) AI(4) – Sensor 2 (RI2) AI(5) – CO2 Measurement
Analogue Value	8	AV(0) - Nominal Setpoint AV(1) - Sensor 1 Temp AV(2) - Sensor 2 Temp AV(3) - Sensor 3 Temp AV(4) - Brightness AV(5) - Y1 Output AV(6) - Y2 Output AV(7) - Y3 Output
Binary Input	5	BI(0) – Digital Input (DI1) BI(1) – Boost (Party Mode) Status BI(2) – Schedule Status (only TRI-P-1R) BI(3) – Time Lost (only TRI-P-1R) BI(4) – Auto Fan Status
Binary Output	9	BO(0) – Relay BO(1) - OFF Status [1] BO(2) - ECO Status [1] BO(3) – Lights [2] BO(4) – AC [2] BO(5) – Lock [1] BO(6) – Frost Icon BO(7) - Non Volatile Update (updates setpoints/configuration parameters) BO(8) – Boost Icon
MutliState Value	7	**MSV(0) - Ring Colour [Read/Write]** (1-White, 2=Red, 3=Blue, 4=Green, 5=Orange, 6=Yellow, 7=Magnenta, 8=Cyan, 9=Sensor1, 10=Sensor2, 11=Sensor3) **MSV(1) - ModeIconOverride [Read/Write]** (1=Auto, 2=Heating, 3=Cooling, 4=Fan, 5=None) [3] **MSV(2) - FanAutoSpeed [Read/Write]** 1..7 (corresponding speeds 0..6)[4] **MSV(3) - Device Mode Status [Read Only]** (1=Comfort, 3=OFF, 4=Boost) **MSV(4) - Alarm Status [Read Only]** (Add 1 to to bit values) Bit 0 - Internal NTC (1) Bit 1 - RI1 (2) Bit 2 - RI2 (4) Bit 3 - Humidity Sensor (8) Bit 4 - DI1 (16) Bit 5 - DI2 (Not Applicable) Bit 6 - Time Lost (64) **MSV(5) - Mode Icon Status [Read Only]** (1=Auto, 2=Heating, 3=Cooling, 4=Fan) **MSV(6) - Fan Speed Status [Read Only]** 1..7 (corresponding speeds 0..6)[4]

Note 1: If the BACnet object state is overriden locally (e.g. OFF/ECO/Lock locally cancelled), then to read the device status in the Present Value field, set all TRIority inputs to 'null'.

Note 2: Light and AC icons can be locally overridden only if the all TRIority inputs are set to 'null'.

Note 3: Set to '5=none' to allow users to change the Mode through the screen.

Note 4: The maximum number depends on the selected Fan Speed Mode. E.g if 3-speed is selected, then the range is 1..4 (corresponding speeds 0..3).

Device Object Properties

Property Name /ID	Attributes	Range	Default
Object Identifier	R/W		20
Object Name	R/W	32 Characters Max	Concatenation of product type and MAC address i.e. "TRI_001"
Object Type	R		Device
System Status	R		STATUS_OPERATIONAL
Vendor Name	R		Produal Oy
Vendor Identifier			783
Model Name	R		TRI7
Protocol Version	R		1
Protocol Revision	R		10
Max APDU Length	R		480
Segmentation Support	R		No
APDU Timeout	R		6000 ms
Number APDu Retries	R		3
MaxMaster	R		127
Max_Info_Frames	R		1
Database Revision	R		0

App_Config Object

NOTE: Application Configuration Object exposes the configuration parameters over the BACnet. However please check if your BACnet client can support ProTRIetary Object types to be able to access these parameters. Alternatively set the configuration parameters through the SRT touchscreen.

	Property Name /ID	Attributes	Range	Default
Required Object Properties	Object Identifier	R		proTRIetary-128
	Object Name	R/W		"App_Config"
	Object Type	R		proTRIetary-128
Optional Properties	None			

	Property ID	Description	BACnet Data Type	Range
ProTRIetary Properties	40100	Nominal Setpoint	REAL	0.0...99.9°C/°F (Default 21°C)
	40101	Setpoint Unit	Unsigned	0 = Temperature (Default) 1 = Percentage 2 = None (no setpoint)
	40102	Sensor 3 Source	Unsigned	0 = Buillt-In Sensor (Default) 1 = Network Sensor
	40104	Minimum Setpoint	REAL	0.0...99.9°C/°F/% (Default 14°C)
	40105	Maximum Setpoint	REAL	0.0...99.9°C/°F/% (Default 30°C)
	40107	Sensor 1 Source	Unsigned	0 = RI1 1 = Network Sensor (Default)
	40109	Fan Manual Control Mode	Unsigned	0 = Disabled (default) 1 = 1-Step 2 = 2-Step 3 = 3-Step 4 = 6-Step 5 = 1-Step + Auto 6 = 2-Step + Auto 7 = 3-Step + Auto 8 = 6-Step + Auto 9 = Advanced

	40110	Fan Display	Unsigned	0 = Disabled (default) 1 = Bar & Fan 2 = Bar 3 = Fan 4 = Coloured Bar & Fan 5 = Coloured Bar
	40112	Enable Mode Icon	Unsigned	0 = Disabled (default) 1 = Htg/Clg 2 = Htg/Clg/Fan 3 = Auto/Htg/Clg 4 = Auto/Hhg/Clg/Fan 5 = Auto/Htg/Fan 6 = Auto/Clg/Fan
	40113	Digital Input Mode	Unsigned	0 = Disabled (no TRI effect) 1 = Close for ECO 2 = Open for ECO 3 = Close for OFF 4 = Open for OFF 5 = DI Contact Alarm 6 = Network 7 = Close for Night
	40114	Digital Input Delay	Unsigned	0..7200 seconds (Default 0s)
	40115	Enable Lights Symbol	Unsigned	0 = Disabled (default) 1 = Enabled
	40116	Enable AC Symbol	Unsigned	0 = Disabled (default) 1 = Enabled
	40117	Lock Mode	Unsigned	0 = Lock mode disabled (default) 1 = On/Off/Boost workable only 2 = Temp settings only available 3 = All buttons disabled
	40118	Show Temperature Unit Selection Icon (Centigrade / Fahrenheit)	Unsigned	0 = Disabled (default) 1 = Enabled
	40119	Built-In Sensor Calibration	REAL	-10.0..+10.0 °C/°F
	40120	RI1 Sensor Calibration	REAL	-10.0..+10.0 °C/°F
	40121	RI2 Sensor Calibration	REAL	-10.0..+10.0 °C/°F
	40122	Humidity Sensor Calibration	REAL	-10.0..+10.0 %rH
	40123	Humidity Display	Unsigned	0 = Disabled 1 = Enabled (default)
	40125	Party Mode (Boost) Time	Unsigned	0..480 minutes (Default 0) 0 = Disabled
	40126	Backlight Brightness	Unsigned	0..20 (default 5)
	40127	Relay Control Mode Control = Controlled by the time schedule / party mode boost Network = Controlled by network.	Unsigned	0 = Control Normally Open (Default) 1 = Control Normally Closed 2 = Network
	40128	Lock Mode Password	Unsigned	0000...9999
	40129	Maintenance Mode Password	Unsigned	0000...9999
	40133	Enable OFF Icon	Unsigned	0 = Disabled (Default) 1 = Enabled (Home Screen)
	40135	Night Speed - Set Fan Speed in Night Mode	Unsigned	0..6
	40137	Staff Code	Unsigned	0000...9999
	40138	Language	Unsigned	0 = English (Default) 1 = Finnish 2 = Swedish

	40139	Sensor 1 Text (RI1/Network) Default 0 = Disabled Note: Disabled removes the text and measurement from the display.	Unsigned	0 = Disabled 1 = Room 2 = Floor 3 = Outside
	40140	Sensor 2 Text (RI2/Network) Default: 0 = Disabled Note: Disabled removes the text and measurement from the display.	Unsigned	4 = Zone 1 5 = Zone 2 6 = Zone 3 7 = Bathroom
	40141	Sensor 3 Text (Built-in / Network Sensor) Default: 1 = Room Note: Disabled removes the text and measurement from the display.	Unsigned	8 = Sauna 9 = Bedroom 10 = Kitchen 11 = Cooler 12 = Flow 13 = Hot Water 14 = Tank 15 = Pool 16 = Cabin
	40142	Sensor 2 Source	Unsigned	0 = RI1 1 = Network Sensor (Default)
	40159	Disable ECO Button User Cancel	Unsigned	0 = Enabled 1 = Disabled
	40160	CO2 Calibration	REAL	-500...+500 ppm
	40161	Y1 Output Mode Default: Fan	Unsigned	0 = Network 1 = Sensor1 (RI1)
	40162	Y2 Output Mode Default: Setpoint	Unsigned	2 = Sensor2 (RI2) 3 = Sensor3 (Built-In)
	40163	Y3 Output Mode Default: Sensor2 (Built-in)	Unsigned	4 = Setpoint 5 = Fan 6 = Humidity 7 = CO2
	40167	Display CO2	Unsigned	0 = Enabled 1 = Disabled
	40168	Setpoint Limit Mode	Unsigned	0 = Absolute 1 = Relative
	40300	MAC ID	Unsigned	0..127 (Default 1)
	40301	BACnet Baud Rate	Unsigned	0 = 9600 (Default) 1 = 19200 2 = 38400 3 = 57600 4 = 76800 5 = 115200
	40304	Screen Refresh Rate	Unsigned	0 = Fast (Default) 1 = Medium 2 = Slow
	40400	Force Reset	Unsigned	0 = Normal 1 = Force Reset
	40401	Non Volatile Memory Update	Unsigned	0 = Normal 1 = Update
	40403	Force Factory Defaults	Unsigned	0 = Normal 1 = Force Defaults

NOTE:Information is subject to change without prior notice.

Dimensions

Standard Unit

88mm / 3.46″

112mm / 4.41″

14.5mm / 0.56″

28.5mm/1.22″

43mm / 1.69″

52mm / 2.05″

With CO2-Sensor Fitted

88mm / 3.46″

112mm / 4.41″

53mm / 2.09″

20.5mm/0.81″

28.5mm/1.22″

49mm / 1.93″

52mm / 2.05″