Networkable VAV Controller

Specification and Installation Instructions

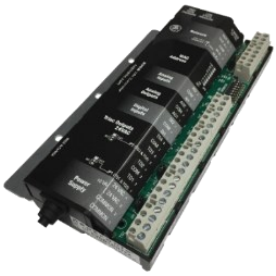


Controller Models

EVCB14NIT0X
(0 TRIACS / independent / external motor)
For use with external floating or modulating actuators

EVCB14NIT4X
(4 TRIACS / independent / external motor)
For use with external floating or modulating actuators

EVCB14NDT4X
(4 TRIACS / dependent / external motor)
For use with external floating or modulating actuators



EVCB14Nx Series



TDU00 / TDU30 / TDU60 Series

TDU Series Digital Room Sensor

TDU00	*(Vertical Grey LCD, white enclosure)*
TDU30	*(Vertical Black LCD, black enclosure)*
TDU60	*(Vertical Black LCD, white enclosure)*
TDU10	*(Horizontal Grey LCD, white enclosure)*
TDU40	*(Horizontal Black LCD, black enclosure)*
TDU70	*(Horizontal Black LCD, white enclosure)*



TDU10 / TDU40 / TDU70 Series



TRL24 Series



TRL54 Series

TRL Series Digital Room Sensor

TRL24	*(With temperature sensor)*
TRLH24	*(With temperature and humidity sensor)*
TRLG24	*(With temperature and CO_2 sensor)*
TRLGH24	*(With temperature, CO_2 and humidity sensors)*
TRL 54	*(With temperature sensor)*

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TRL54/TDU Programming Mode Menus
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EVCB14Nx Series Controller

Overview

The EVCB14Nx Series is a combination controller and digital room sensor with support for networked communications via the BACnet MS/TP or Modbus protocol. The controller is compatible with TRL24, TRL54, and TDU series digital room sensors. The Networkable VAV Controller is designed for simple and accurate control of any variable air volume box in a number of zone control configurations. Its field configurable algorithms enable versatile implementation of required control sequences.

Features

- Field configured VAV algorithms, inputs and outputs
- Control external actuators using analog (0-10Vdc, adjustable) or floating signals with feedback
- On-board differential pressure sensor
- Select direction on analog outputs
- Simple air balancing and commissioning via digital room sensor
- Configurable PI (Proportional-Integral) function
- Independent, configurable proportional control band and dead band per ramp
- Activate output with CO_2 sensor from TRL/TDU or external input
- Selectable internal or external temperature sensor (10KΩ)
- Changeover by contact or external temperature sensor
- Internal and external temperature sensor calibration
- Freeze protection
- Removable, rising clamp, non-strip screw terminal blocks

Operational Features

- Backlit LCD with simple icon and text driven menus
- Select digital room sensor's default display
- Network service port via on-board mini-USB connector
- Manual night setback or no occupancy override
- Multi level lockable access menu and setpoint
- Selectable Fahrenheit or Celsius scale
- 3-wire connection to controller and 4 push keys

Network Communication

- BACnet MS/TP or Modbus communication port
- Select MAC address via DIP switch or via network
- Automatic baud rate detection

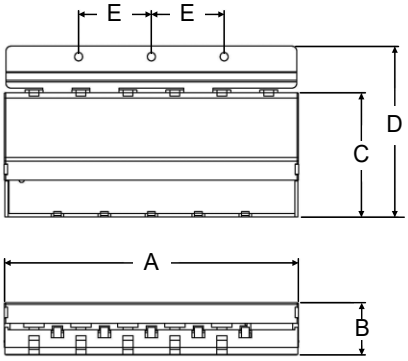
BACnet MS/TP®

- Automatic device instance configuration
- Copy & broadcast configuration via digital room sensor menu or via BACnet to other controllers
- BACnet scheduler
- Firmware upgradeable via BACnet
- Support COV (change of value)

Modbus

- Modbus @ 9600, 19200, 38400 or 57600 bps
- RTU Slave, 8 bits (configurable parity and stop bits)
- Connects to any Modbus master

Specifications

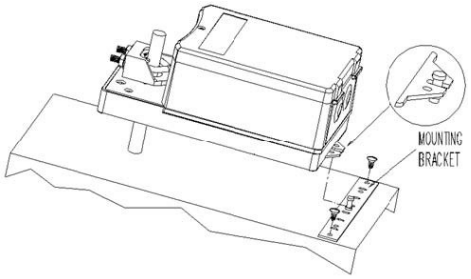
Description	EVCB14 Series Controller
Power consumption	10 VA max
Power supply	22 to 26 Vac 50/60 Hz
Inputs	2 Universal inputs (Thermistor 10KΩ Type 3, digital 24Vac/dry contact, or 0-10Vdc)
	2 digital inputs
Outputs	2 analog outputs (0-10 Vdc or 2-10Vdc; selectable)
	Up to 4 TRIAC outputs 24 Vac, 500mA max thermal fuse in series with each TRIAC output (on/off, pulse, or 2 floating outputs)
Real Time Clock	Real-time clock (RTC) with super capacitor backup (approximately 3 days)
BACnet	BACnet® MS/TP @ 9600, 19200, 38400 or 76800 bps (BAS-C)
Modbus	Modbus RTU slave @ 9600, 19200, 38400 or 57600. Selectable parity and stop bit configuration: No parity, 2 stop bit | Even parity, 1 stop bit | Odd parity, 1 stop bit
Communication connection	Low capacitance, EIA RS-485, 22 or 24 AWG shielded twisted pair multi-strand cables (Belden 9841 or equivalent).
Digital Room Sensor connection	Insulated 3 core multi-strand 22 or 24 AWG cable. Maximum 50ft (15m) between controller and digital room sensor.
Electrical connection	**Terminal Type**: *22~12AWG pluggable rising clamp screw terminal blocks* **Power Wiring**: Insulated 2 core 0.8 mm^2 [18 AWG] minimum power cable. **Digital Room Sensor Wiring**: Insulated 3 core multi-strand 22 or 24 AWG cable. Maximum 50ft (15m) between controller and digital room sensor. **Communication Wiring:** Low capacitance, EIA RS-485, 22 or 24 AWG shielded twisted pair multi-strand cables (Belden 9841 or equivalent).
Operating temperature	0ºC to 50ºC [32ºF to 122ºF]
Storage temperature	-30ºC to 50ºC [-22ºF to 122ºF]
Relative Humidity	5 to 95% non condensing
Weight	1.8 kg. [4 lb]
Dimensions A = 7.20” | 183mm B = 1.23” | 31mm C = 2.93” | 74mm D = 4.02” | 102mm E = 1.78” | 45mm	

Mechanical Installation- Actuator

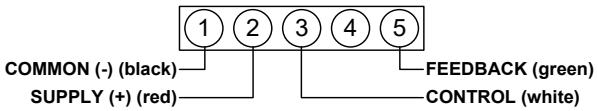
1. Manually close the damper blades and position the actuator to 0º or 90º.
2. Slide the actuator onto the shaft.
3. Tighten the nuts on the “U” bolt to the shaft with an 8mm wrench to a torque of 150 in.lb. [17 Nm].
4. Slide the mounting bracket under the actuator. Ensure free movement of the slot at the base of the actuator. Place the bracket pin at mid distance of the slot.
5. Affix the bracket to the ductwork with #8 self-tapping screws.
6. Connect the cable from the EVC to the terminal in the actuator as shown.

Do not press the clutch when the actuator is powered.

External 180 in. lb. Actuator

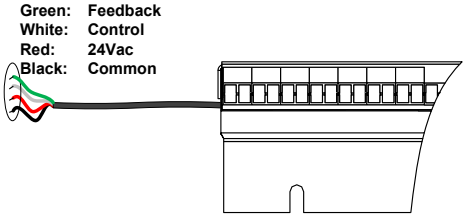


Terminals on the Actuator



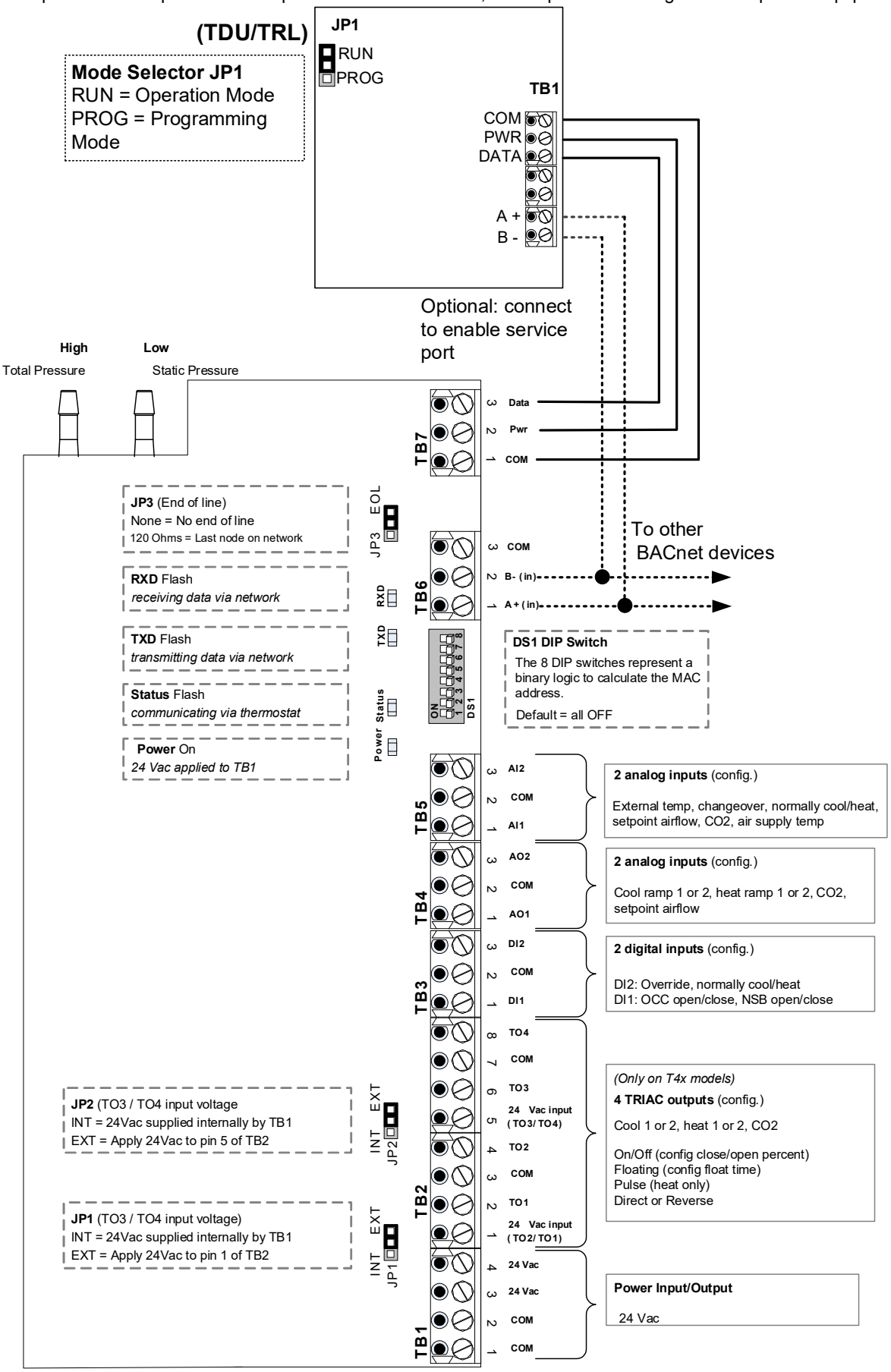
Signal cable from EVC controller

Use to connect the external motor on EVCB14NIT0X EVCB14NIT4X and EVCB14NDT4X.



Wiring

We strongly recommend that all Neptronic products be wired to a separate grounded transformer and that transformer shall service only Neptronic products. This precaution will prevent interference with, and/or possible damage to incompatible equipment.



BACnet or Modbus Address DIP Switch (DS1)

MAC address for communication, are selectable by DIP switch using binary logic. If you do not change device instance in program mode, it will be automatically modified according to the MAC address.

Note: Avoid using addresses above 246 when selecting Modbus MAC address.

MAC Address	DS.1 = 1	DS.2 = 2	DS.3 = 4	DS.4 = 8	DS.5 = 16	DS.6 = 32	DS.7 = 64	DS.8 = 128	Default Device Instance
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	153000
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	153001
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	153002
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	153003
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	153004
…	…	…	…	…	…	…	…	…	…
126	OFF	ON	ON	ON	ON	ON	ON	OFF	153126
127	ON	ON	ON	ON	ON	ON	ON	OFF	153127

** Slave addresses available by setting DS.8 to ON*

Digital Room Sensors

Models

Vertical Model #	Temp	RH	CO_2	PIR	VOC
TDU00-100 TDU30-100 TDU60-100	•				
TDU00-101 TDU30-101 TDU60-101	•	•			
TDU00-102 TDU30-102 TDU60-102	•	•	•		
TDU00-104 TDU30-104 TDU60-104	•			•	
TDU00-105 TDU30-105 TDU60-105	•	•		•	
TDU00-106 TDU30-106 TDU60-106	•	•	•		•
TDU00-107 TDU30-107 TDU60-107	•	•	•	•	•
TDU00-108 TDU30-108 TDU60-108	•	•	•	•	



TDU00 Series



TDU30 Series



TDU60 Series

Horizontal Model#	Temp	RH	CO_2
TDU10-100 TDU40-100 TDU70-100	•		
TDU10-101 TDU40-101 TDU70-101	•	•	
TDU10-102 TDU40-102 TDU70-102	•	•	•
TDU10-103 TDU40-103 TDU70-103	•		•



TDU10 Series



TDU40 Series



TDU70 Series

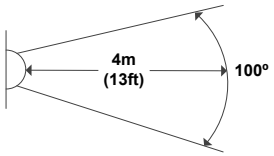
Model #	Type	Temp	RH	CO_2
TRL24	2 x 4	•		
TRLG24	2 x 4	•		•
TRLH24	2 x 4	•	•	
TRLGH24	2 x 4	•	•	•
TRL54	3 x 3	•		


TRL24 Series



TRL54

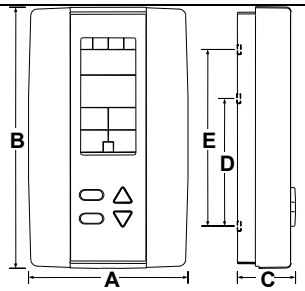
Specifications

Description	TRL24, TRL54, and TDU Series
Temperature Sensor (TRL24, TRL54, and TDU)	
Setpoint range	10ºC to 40ºC [50ºF to 104ºF]
Control accuracy	Temperature: ±0.4ºC [0.8ºF]
Display resolution	±0.1ºC [0.2ºF]
Humidity Sensor (TRLH24, TRLGH24 and TDU models with Humidity Sensors)	
Sensor range	5 to 95%RH
Display resolution	0.1%
CO_2 Sensor (TRLG24, TRLGH24 and TDU models with CO_2 Sensors)	
Operating principle	Self-calibrating, Non-Dispersive Infrared (NDIR)
Sensor Range	0 to 2000 ppm
Setpoint range	100 to 2000 ppm
Accuracy	±30 ppm ±3% of reading
Response time	2 minutes by 90%
Display resolution	1 ppm
PIR Motion Sensor (TDU00 / TDU30 / TDU60 models with PIR Sensor)	
Operating Principle	Passive Infrared (PIR)
Detection Angle	100°
Detection Distance	4m [13ft]
Detection Area	
VOC Sensor (TDU00 / TDU30 / TDU60 models with VOC Sensor)	
Operating Principle	Self-calibrating, Non-Dispersive Infrared (NDIR)
Sensor Range	0-1000 ppb isobutylene equivalent tVOCs
Response Time	<5 seconds for tVOC
Start up Time	15 minutes
Other	
Terminal Type	**TRL** models: 28~14 AWG pluggable screw terminals **TDU00/30/60** models without CO2: 22~18 AWG pluggable push-button terminals **TDU00/30/60** models with CO2: 20~14 AWG pluggable rising cage clamp screw terminals **TDU10/40/70** models: 26~14 AWG pluggable rising cage clamp screw terminals
Electrical connection	**Digital Room Sensor Wiring**: Insulated 3 core multi-strand 22 or 24 AWG cable. Maximum 50ft (15m) between controller and digital room sensor. **Communication Wiring:** Low capacitance, EIA RS-485, 22 or 24 AWG shielded twisted pair multi-strand cables (Belden 9841 or equivalent).
Network service port	Mini USB connector
Power supply	24Vac
Power consumption	1VA
Operating temperature	0ºC to 50ºC [32ºF to 122ºF]
Storage temperature	-30ºC to 50ºC [-22ºF to 122ºF]
Relative humidity	5 to 95 % non condensing
Enclosure protection	IP 30 (EN 60529)
Weight	120 g. [0.25 lb]

Dimensions

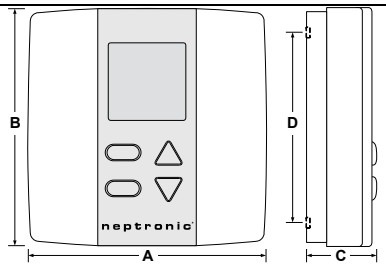
TRL24

A = 2.85” | 73mm
B = 4.85” | 123mm
C = 1.00” | 24mm
D = 2.36” | 60mm
E = 3.27” | 83mm



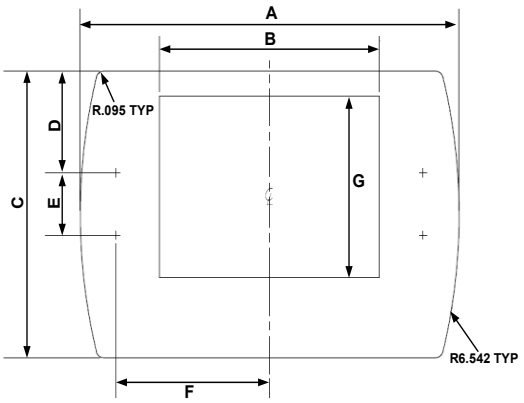
TRL54

A = 3.00” | 78mm
B = 3.00” | 78mm
C = 1.00” | 24mm
D = 2.36” | 60mm



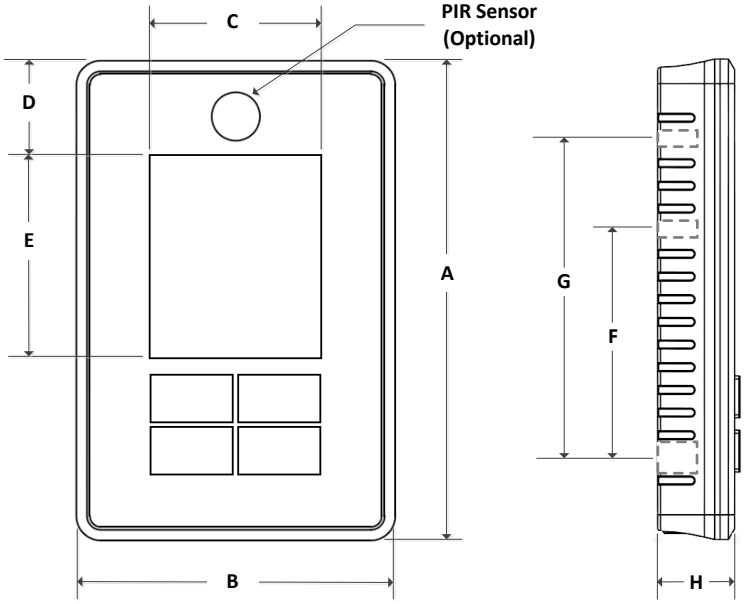
TDU10 / TDU40 / TDU70 Series

A = 5.24” | 133mm
B = 2.87” | 73mm
C = 3.74” | 95mm
D = 1.22” | 31mm
E = 0.75” | 19mm
F = 2.00” | 51mm
G = 2.18” | 55mm



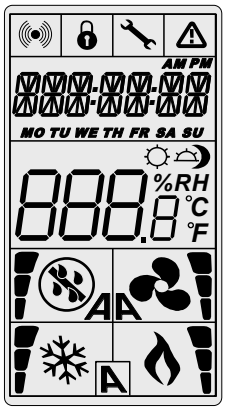
TDU00 / TDU30 / TDU60 Series

A = 4.88” | 124mm
B = 3.25” | 83mm
C = 1.75” | 44mm
D = 0.96” | 24mm
E = 2.07” | 53mm
F = 2.36” | 60mm
G = 3.28” | 83mm
H = 0.78” | 20mm *(without CO_2)*
0.95” | 24mm *(with CO_2)*



Interface

TRL24



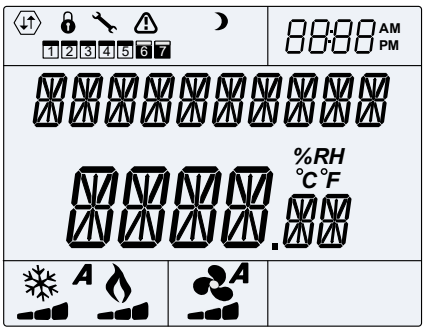
A	Cooling ON A: Automatic		Communication Status		Alarm status
A	Heating ON A: Automatic		Menu Locked		Energy saving mode (NSB or Occupancy)
A	Fan ON A: Automatic		Programming mode (Technician setting)	%RH	Percentage of humidity
				°C or °F	°C: Celsius scale °F: Fahrenheit scale

TRL54



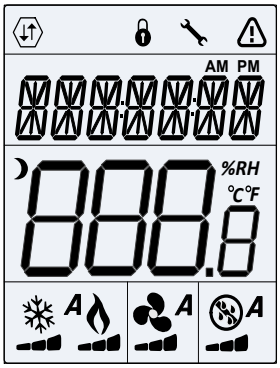
A	Cooling ON A: Automatic		Programming mode (Technician setting)		Alarm status
A	Heating ON A: Automatic		Menu set-up Lock		Energy saving mode (NSB or Occupancy)
MIN MAX	*Minimum/Maximum*	°C or °F	°C: Celsius scale °F: Fahrenheit scale		

TDU10 / TDU40 / TDU70 Series



	Network Communication		*User Lock*		*Programming Mode (Technician Setting)*
	Alarm Status		*Energy Saving Mode (NSB/OCC)*	1 2 3 4 5 6 7	*Schedule*
88:88 AM PM	*Time*	*ppm*	*Parts Per Million*	°C °F %RH	*°C: Celsius Scale* *°F: Fahrenheit Scale* *%RH: Humidity*
A	*Automatic Mode*		*Cooling*		*Heating*
					Fan

TDU00 / TDU30 / TDU60 Series



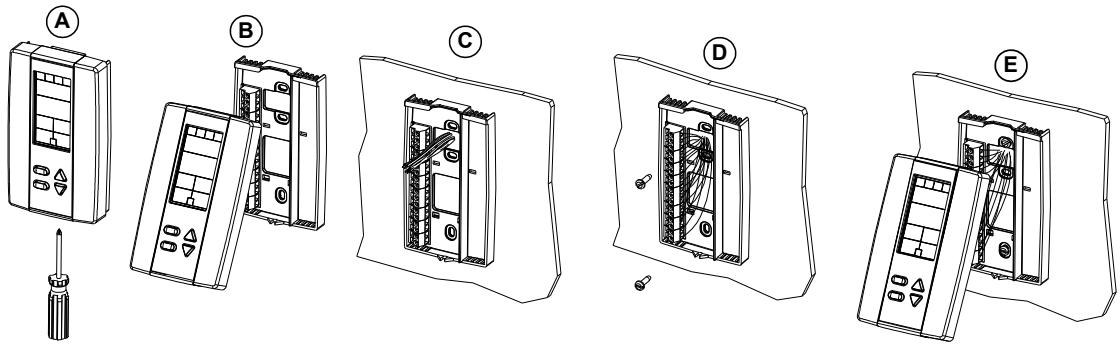
	Network Communication		*User Lock*		*Programming Mode (Technician Setting)*
	Alarm Status		*Energy Saving Mode (NSB/OCC)*	AM PM	*Time*
°C °F %RH	*°C: Celsius Scale* *°F: Fahrenheit Scale* *%RH: Humidity*	*A*	*Automatic Mode*		*Cooling*
	Heating		*Fan*		

Mounting Instructions

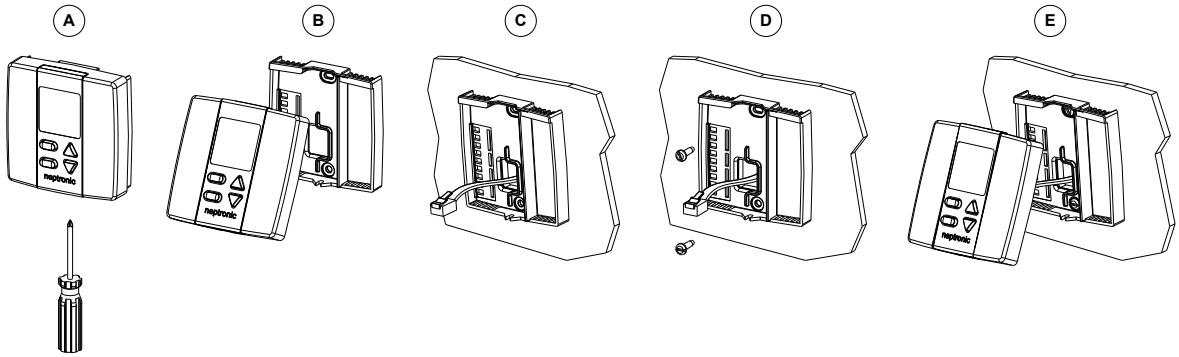
CAUTION: Remove power to avoid a risk of malfunction.

A. Remove the captive screw that's holding the base and the front cover of the unit together.
B. Lift the front cover of the unit to separate it from the base.
C. Pull all wires through the holes in the base.
D. Secure the base to the wall using wall anchors and screws (supplied). Make the appropriate connections.
E. Mount the control module on the base and secure using the screw.

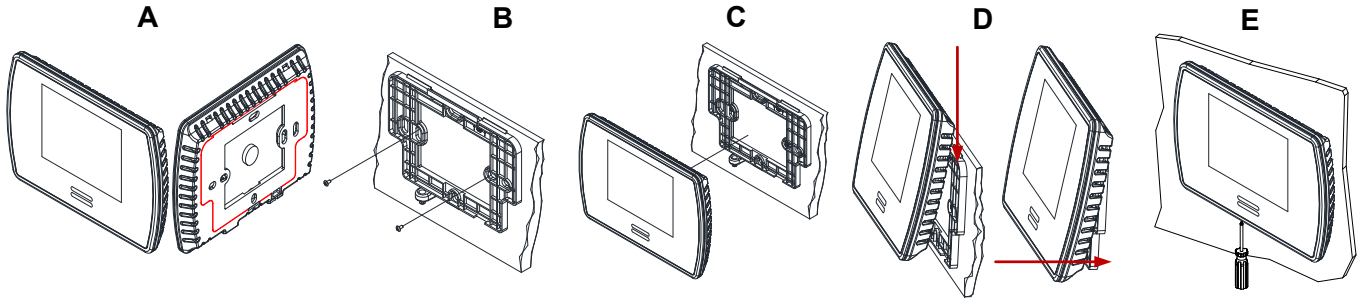
TRL24



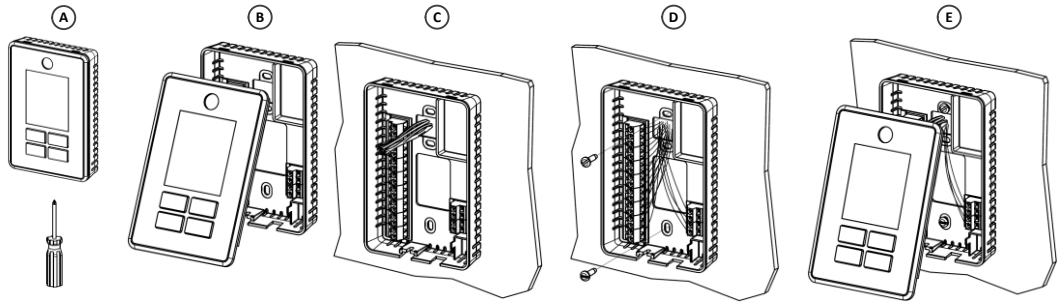
TRL54



TDU10 / TDU40 / TDU70 Series



TDU00 / TDU30 / TDU60 Series



Programming Mode Menus

Accessing the Programming Mode

To access the programming mode, put the TDU/TRL in PROG mode. To do this:

- Remove the backplate of the TDU/TRL from its base
- Place the Mode Selector jumper (JP1) to PROG
- Replace the backplate

After making the changes to programming mode, put the TDU/TRL back in RUN mode to resume normal operation. To do this:

- Remove the backplate of the TDU/TRL from its base
- Place the Mode Selector jumper (JP1) to RUN
- Replace the backplate

*Note: If the **User Setpoint Locked** option in Temperature settings is set to **No** (TRL/TDU menus on page 17 and 24), the setpoint and control mode can be changed by the end user.*

Navigating the Programming Menus

The menu overviews and options are the same for both TRL and TDU digital room sensors. However, the action button or the button used to access the menus and save changes is different in the digital room sensors. Use the following menu overviews with the appropriate action key as per your digital room sensor.

Action Buttons on Digital Room Sensor

Action Button		Task
TRL	TDU	
		Press to access the programming menus and save any changes.
		Press to return to the previous step without saving.

TRL24 & TDU Series – Pressure & Applications | Menu (1 of 7) | *Pressure and Applications*

For a description of the default settings for each application refer to Annex A: Control Apps on page 33.



We recommend selecting the `Control Apps` before changing any other configurations. Once selected, certain configurations, such as NSB, proportional bands, and deadbands, will be erased and reset to factory default values.

TRL24 & TDU Series – Inputs | Menu (2 of 7) | *AI1, AI2, DI1 and DI2*

Main Menu | **Sub Menu** | **Configuration**

*** To save any changes, press ★ on TRL and ☐ on TDU ***
*** To the previous step without saving, press ↵ on TRL and TDU ***

▲▼= scroll menu items

Main Menu
- PrSs *(Pressure)*
- APPS *(Applications)*
- **InPt** *(Inputs)*
- OutP *(Outputs)*
- tMp *(Temperature)*
- Mot *(Motor)*
- Setc *(Settings)*
- rMp *(Ramps)*
- NET *(Network)*
- HrS *(Time & Date)*
- btN *(Buttons)*
- OPt *(Options)*
  Only available with CO_2 and humidity sensor models

▲▼= scroll menu items

CONFIG INPUT
- **AI1**
- **AI2**
- **DI1**
- **DI2**

* = StFl not available on pressure dependent model EVCB14NDT4X

▲▼= select / set value

AI1 SIGNAL TYPE MSV.1 (AI1)
- **OFF** *(disabled)*
- EtS *(external temp sensor)*
- SENs *(sensor)*
- NoCl *(normally cool)*
- NoHt *(normally heat)*
- StFl *(setpnt airflow 0-10Vdc)**
- CO2 *(carbon dioxide)*
- ASt *(Air supply temp sensor)*
- mor *(Motor position)*

Go to "AI2"

CH OVER SETPNT: **24°C** AV.58 — Go to "AI2"

CO2 MAXIMUM RANGE: **2000 ppm** AV.140 — Go to "AI2"

CO2 SETPNT: **800 ppm** AV.141 — Go to "AI2"

To display CO_2 without generating an alarm, use a setpoint higher than 2000ppm or the CO_2 Maximum Range (highest of the 2).

▲▼= select / set value

AI2 SIGNAL TYPE MSV.2 (AI2)
- **OFF** *(disabled)*
- EtS *(external temp sensor)*
- SENs *(sensor)*
- NoCl *(normally cool)*
- NoHt *(normally heat)*
- StFl *(setpnt airflow 0-10Vdc)**
- CO2 *(carbon dioxide)*
- ASt *(Air supply temp sensor)*
- mor *(Motor position)*

Go to "DI1"

CH OVER SETPNT: **24°C** AV.58 — Go to "DI1"

CO2 MAXIMUM RANGE: **2000 ppm** AV.140 — Go to "DI1"

CO2 SETPNT: **800 ppm** AV.141 — Go to "DI1"

To display CO_2 without generating an alarm, use a setpoint higher than 2000ppm or the CO_2 Maximum Range (highest of the 2).

▲▼= select / set value

MSB-OCC CONTACT MSV.10 (DI1)
- OFF
- **OCCo** *(occupancy open)*
- OCCc *(occupancy closed)*
- nSbo *(night set back open)*
- nSbc *(night set back closed)*

Go to "DI2"

OCC MINIMUM TIME IN MIN: **30 min** *(0-240)* AV.62

NO OCC OVERIDE DELAY MIN: **120 min** *(0-180)* AV.61 → NO OCC HEATING SETPNT: **16°C / 61°F** AV.19 → NO OCC COOLING SETPNT: **28°C / 82°F** AV.18 — Go to "DI2"

NSB Overide delay Min: **120 min** *(0-180)* AV.60

NSB Mode BV.20
- **StP** *(setpoint)*
- Off

▲▼= select / set value

DI2 SIGNAL TYPE MSV.14 (DI2)
- **OFF**
- Ovrd *(override all)*
- OVH1 *(override heat 1)*
- OVH2 *(override heat 2)*
- OVHt *(override all heat)*
- NoCl *(normally cool)*
- NoHt *(normally heat)*

Go to "OutP"

NSB HEATING SETPNT: **16°C / 61°F** AV.19

NSB COOLING SETPNT: **28°C / 82°F** AV.18

NSB MOTOR MODE MSV.36
- **Auto**
- OPEn

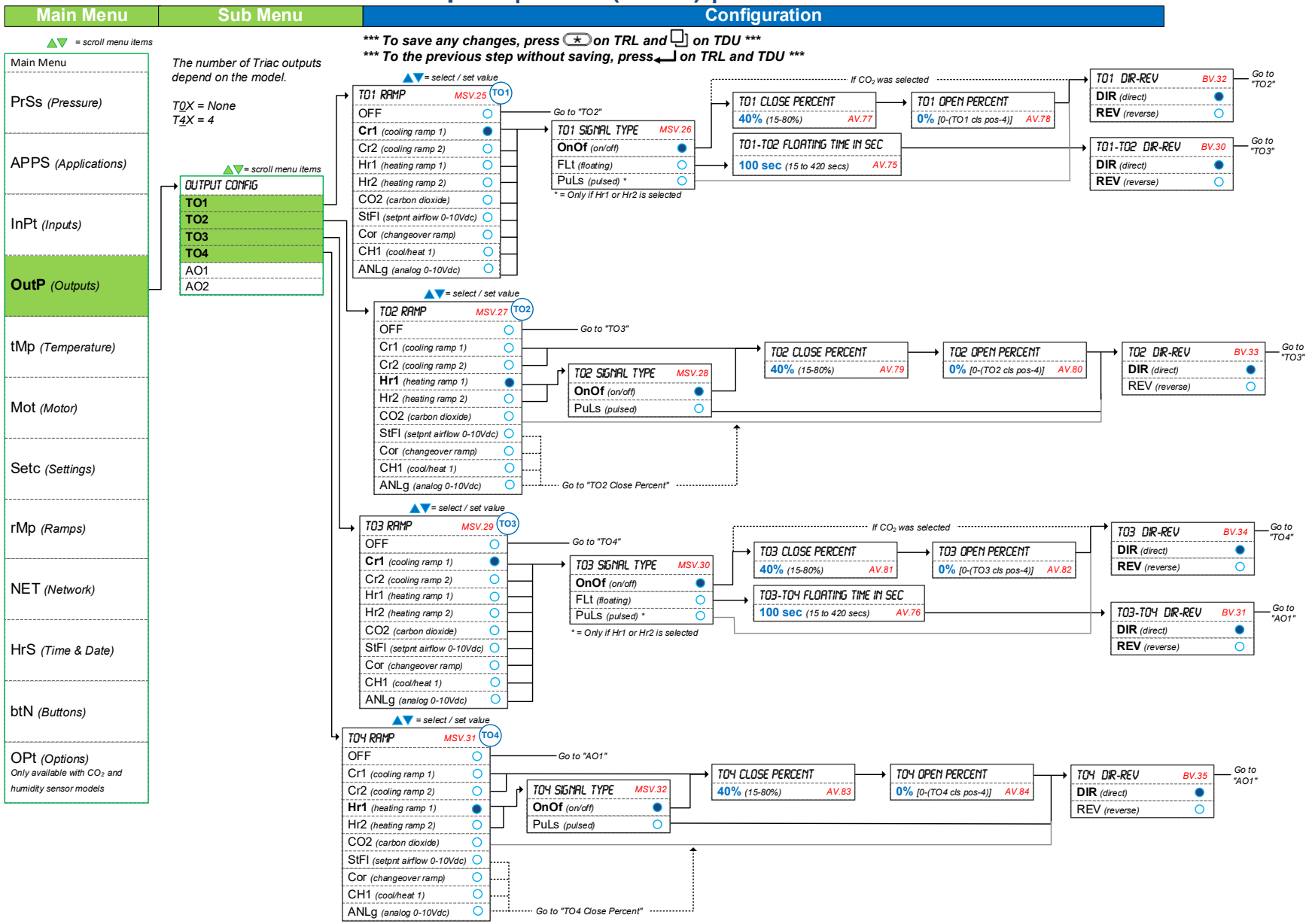
Go to "OutP"

DI2 CONTACT BV.36
- **NO** *(normally open)*
- NC *(normally closed)*

DI2 DELAY SECONDS: **120** *(0-3600)* AV.64 — Go to "OutP"

Go to "OutP"

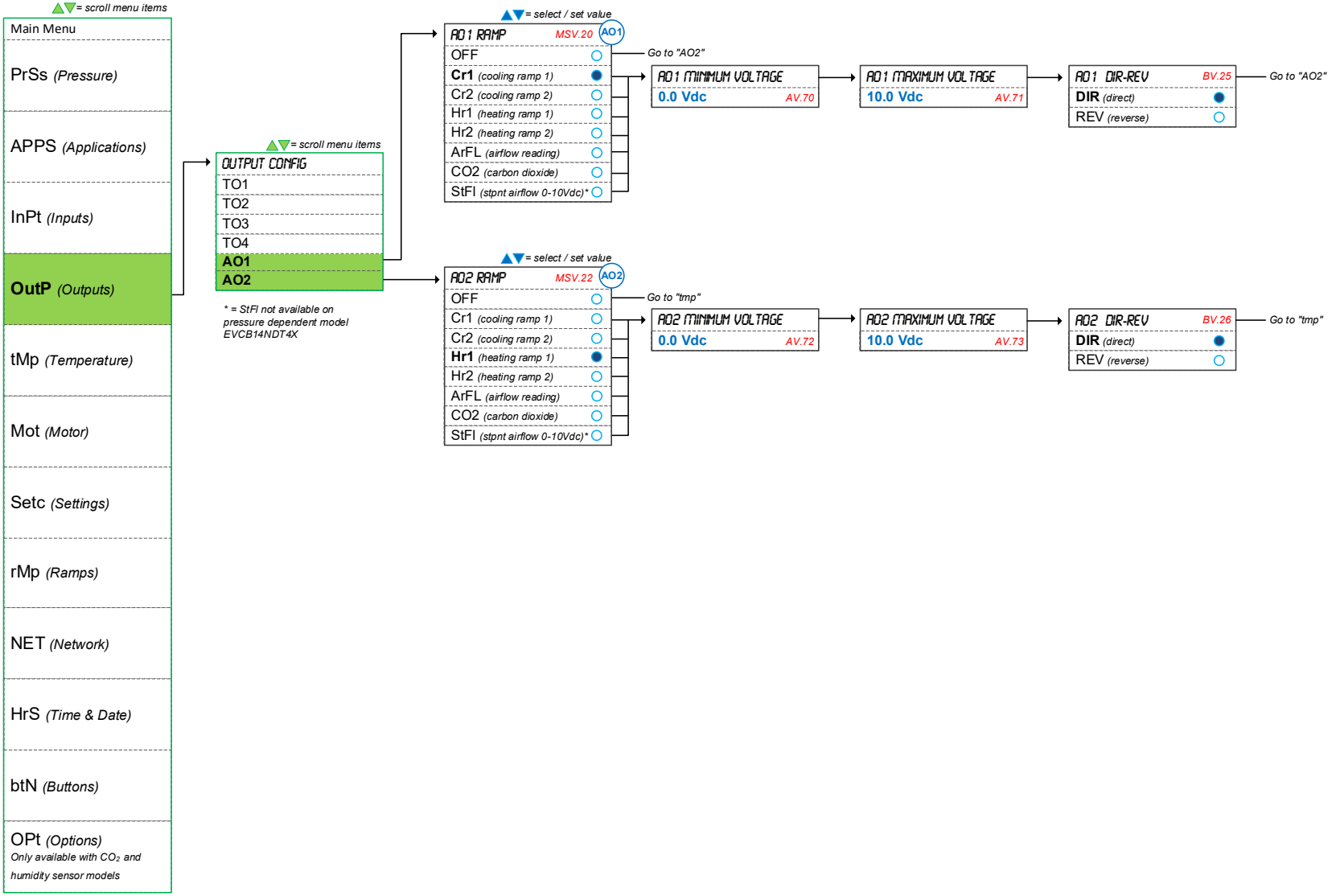
TRL24 & TDU Series – TRIAC Outputs | Menu (3 of 7) | *TO1 to TO4*



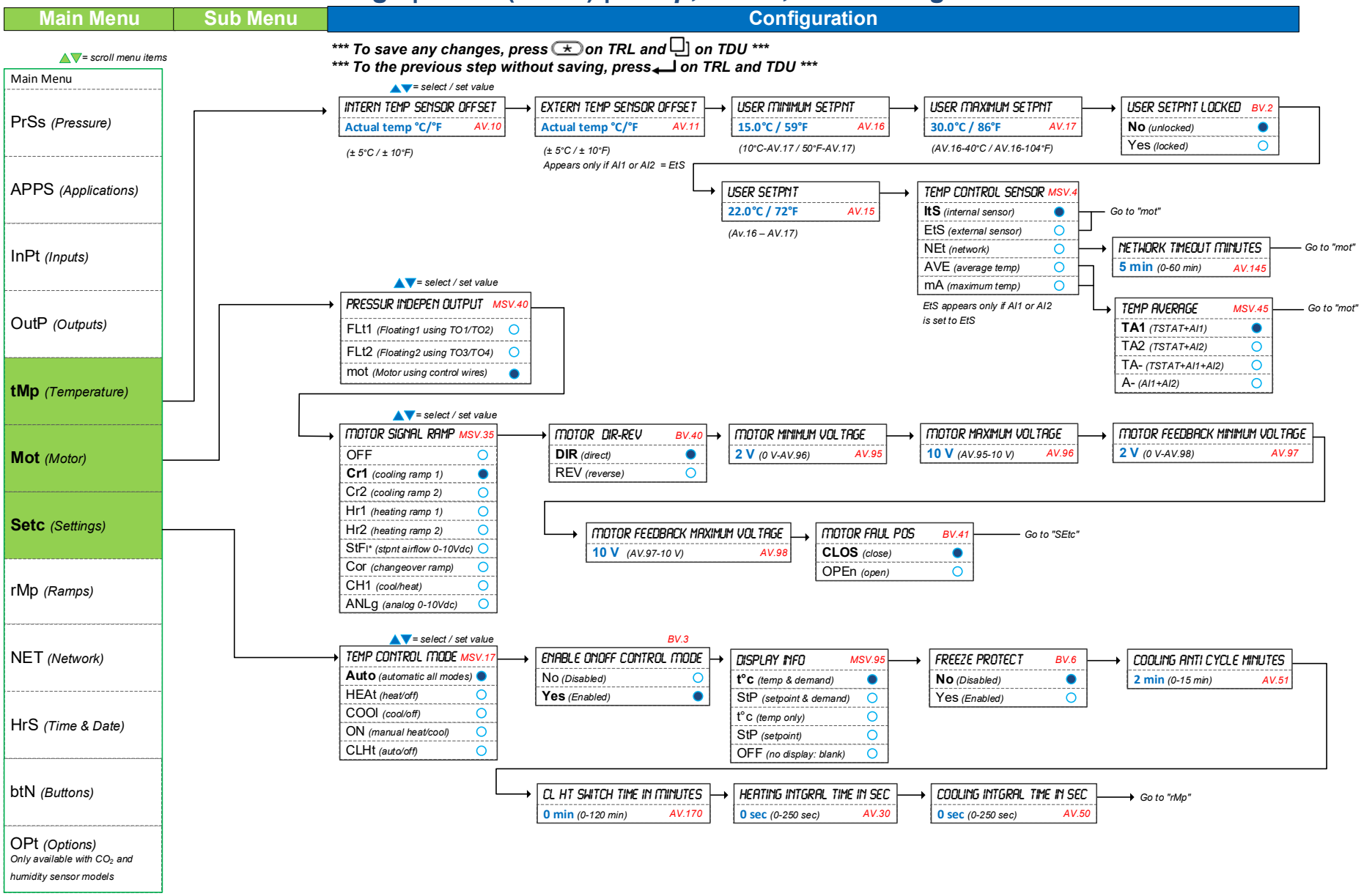
TRL24 & TDU Series – Analog Outputs | Menu (4 of 7) | *AO1 and AO2*

Main Menu	Sub Menu	Configuration

*** To save any changes, press ★ on TRL and ⧉ on TDU ***
*** To the previous step without saving, press ↵ on TRL and TDU ***



TRL24 & TDU Series – Settings | Menu (5 of 7) | *Temp, Motor, and Settings*



TRL24 & TDU Series – Settings | Menu (6 of 7) | *Ramps, Network and Time*

Main Menu | **Sub Menu** | **Configuration**

*** To save any changes, press ★ on TRL and ❑ on TDU ***
*** To the previous step without saving, press ↵ on TRL and TDU ***

▲▼= scroll menu items

- Main Menu
- PrSs *(Pressure)*
- APPS *(Applications)*
- InPt *(Inputs)*
- OutP *(Outputs)*
- tMp *(Temperature)*
- Mot *(Motor)*
- Setc *(Settings)*
- **rMp** *(Ramps)*
- **NET** *(Network)*
- **HrS** *(Time & Date)*
- btN *(Buttons)*
- OPt *(Options)*
  Only available with CO_2 and humidity sensor models

▲▼= scroll menu items

RAMP SETTING
- **COr** *(changeover)*
- **Cr1** *(cooling ramp 1)*
- **Cr2** *(cooling ramp 2)*
- **Hr1** *(heating ramp 1)*
- **Hr2** *(heating ramp 2)*
- **CO2** *(carbon dioxide)*

CH OVER PROP BAND AV.56
2.0°C / 4.0°F *(0.5-5°C / 1-9°F)*
→ **CH OVER DEAD BAND** AV.57
0.3°C / 0.6°F *(0-5°C / 0-9°F)*
→ Go to "Cr1"

CR1 PROP BAND AV.41
2.0°C / 4.0°F *(0.5-5°C / 1-9°F)*
→ **CR1 DEAD BAND** AV.42
0.3°C / 0.6°F *(0-5°C / 0-9°F)*
→ Go to "Cr2"

CR2 PROP BAND AV.46
2.0°C / 4.0°F *(0.5-5°C / 1-9°F)*
→ **CR2 DEAD BAND** AV.47
0.3°C / 0.6°F *(0-5°C / 0-9°F)*
→ Go to "Hr1"

HR1 PROP BAND AV.21
2.0°C / 4.0°F *(0.5-5°C / 1-9°F)*
→ **HR1 DEAD BAND** AV.22
0.3°C / 0.6°F *(0-5°C / 0-9°F)*
→ Go to "Hr2"

HR2 PROP BAND AV.24
2.0°C / 4.0°F *(0.5-5°C / 1-9°F)*
→ **HR2 DEAD BAND** AV.25
0.3°C / 0.6°F *(0-5°C / 0-9°F)*
→ Go to "CO2"

CO2 CONTROL MODE BV.101
- **OPEn** *(open)*
- Ctrl *(control)*

→ Go to "NEt"
→ **CO2 PROP BAND** AV.190
100ppm *(50-250 ppm)*
→ **CO2 DEAD BAND** AV.191
20ppm *(10-50 ppm)*
→ Go to "NEt"

▲▼= scroll menu items

Network Config
- **tYPe** *(Type)*
- **mOd**
- **bAC**
- **CPYc** *(copy config)*

If type = bAC, menu contains "tYpe", "bAC" and "CPYc"

If type = mOd, menu contains "tYpe" and "mOd"

▲▼= select / set value

NETWORK CHOICE
- **bAC** *(BACnet)*
- mOd *(Modbus)*

→ Go to "BACnet Auto Baud Rate"
→ Go to "Modbus Auto Baud Rate"

▲▼= select / set value

MODBUS AUTO BAUD RATE
- No *(Manual)*
- **Yes** *(Automatic)*

→ **MODBUS BAUD RATE**
57.6k *(9.6k, 19.2k, 38.4, 57.6k)*
Modifiable only if Auto Baud Rate set to "No".
→ **MODBUS COMPORT CONFIG**
- **NP2s** *(no parity, 2 stop bits)*
- EP1s *(even parity, 1 stop bit)*
- OP1s *(odd parity, 1 stop bit)*

→ **MODBUS ADDRESS**
1 *(1-246)*
Modifiable only if all DS1 DIP switches are set to OFF.
→ Go to "HrS"

▲▼= select / set value

BACNET AUTO BAUD RATE
- No *(Manual)*
- **Yes** *(Automatic)*

→ **BACNET BAUD RATE** 1001
76.8k *(9.6k, 19.2k, 38.4, 76.8k)*
Modifiable only if Auto Baud Rate set to "No".
→ **MSTP MAC ADDRESS** 1000
0 *(0-254)*
Modifiable only if all DS1 DIP switches are set to OFF.
→ **0153000**
0 *(device instance)*
→ **MSTP MAX MASTER**
127 *(1-127)*
→ Go to "CPYc"

▲▼= select / set value

START ADDRESS
0 *(0-254)* AV.165
→ **END ADDRESS**
0 *(0-254: max=start + 63)* AV.166
→ **CONFIRM COPY CONFIG** BV.90
- **No** *(cancel)*
- Yes *(confirm)*

Go to "HrS"
→ **COPY CONFIG**
in *(in progress)*
→ **COPY CONFIG RESULT**
Succeed AV.167
→ Go to "HrS"

Refer to Copy Config Annnex for a complete list of messages and error codes.

▲▼= select / set value

SET TIME DISPLAY FORMAT
- **24** *(24-hour format)*
- 12 *(AM/PM format)*

→ **HOURS** *Local Time*
12 *(0-23 or 1-12 am/pm)*
→ **MINUTES** *Local Time*
00 *(00-59)*
→ **YEAR** *Local Date*
15 *(15-99)*
→ **MONTH** *Local Date*
1 *(1-12)*
→ **DAY** *Local Date*
1 *(1-31)*
→ Go to "btN"

TRL24 & TDU Series – Settings | Menu (7 of 7) | *Buttons and Options*

Main Menu	Sub Menu	Configuration

*** To save any changes, press ★ on TRL and ❑ on TDU ***
*** To the previous step without saving, press ↵ on TRL and TDU ***

▲▼= scroll menu items

- Main Menu
- PrSs *(Pressure)*
- APPS *(Applications)*
- InPt *(Inputs)*
- OutP *(Outputs)*
- tMp *(Temperature)*
- Mot *(Motor)*
- Setc *(Settings)*
- **rMp** *(Ramps)*
- **NET** *(Network)*
- **HrS** *(Time & Date)*
- **btN** *(Buttons)*
- **OPt** *(Options)*
  Only available with CO_2 and humidity sensor models

▲▼= select / set value

BOTTOM LEFT KEY LOCKED		UPPER LEFT KEY LOCKED		ARROWS KEY LOCKED	
NO	●	**NO**	●	**NO**	●
YES	○	YES	○	YES	○

go to "OPt"

Appears on models with CO_2 sensor.

CO2 DISPLAY BV.65	
YES	○
NO	●

When set to YES, the unit will not display the time when in Operation Mode

Appears on models with CO_2 sensor.

CO2 SETPNT AV.141
800 ppm

To display CO_2 without generating an alarm, use a setpoint higher than 2000ppm or the CO_2 Maximum Range (highest of the 2).

Appears on models with CO_2 sensor.

CO2 CONTROL SOURCE BV.66	
trL	○
ANLg	●

Appears on models with RH sensor.

DISPLAY HUMIDTY BV.60	
YES	○
NO	●

Go to "PrSs"

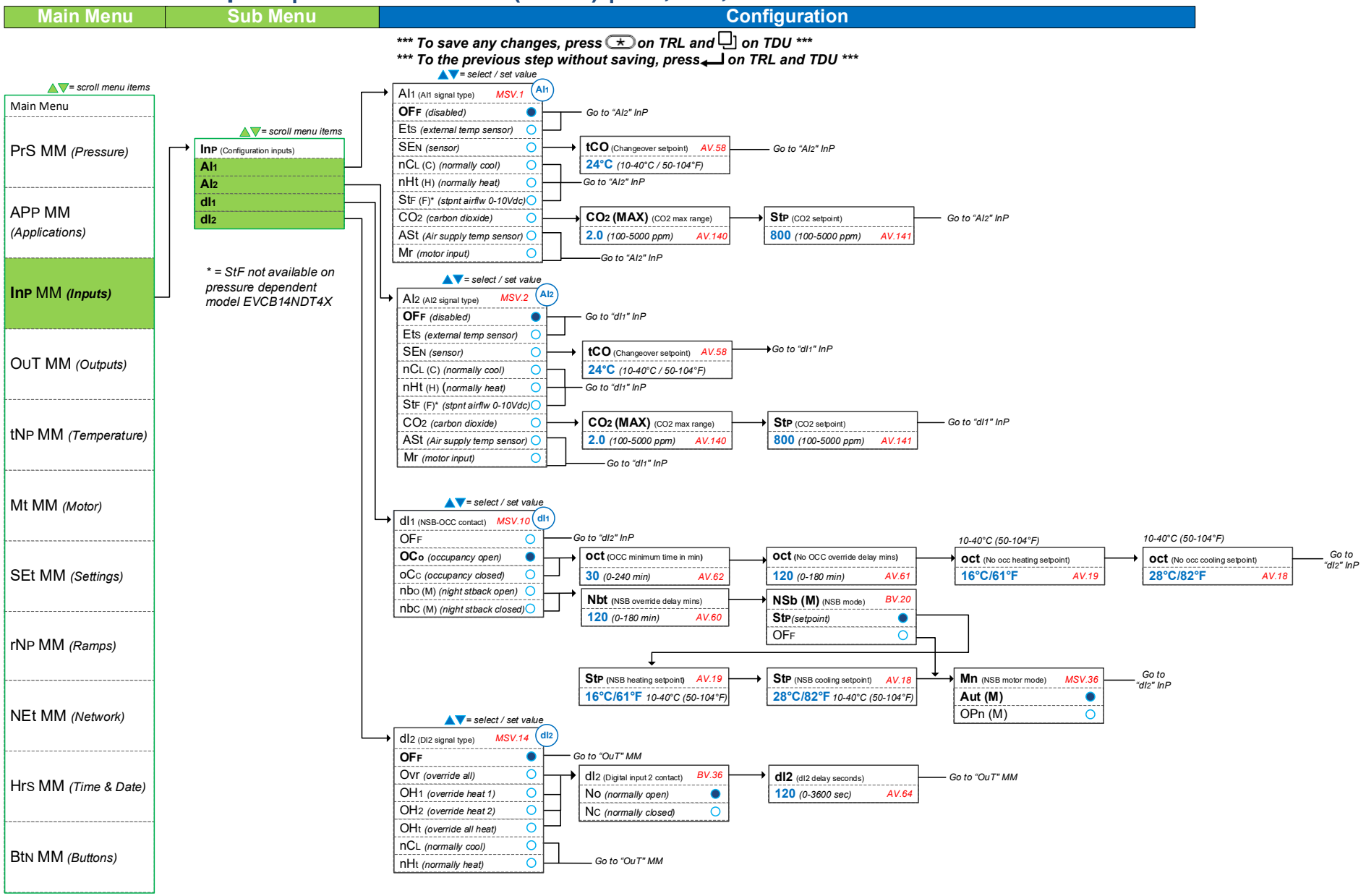
TRL54 Series – Pressure & Applications | Menu Overview (1 of 6) | *Pressure and Applications*

For a description of the default settings for each application refer to Annex A: Control Apps on page 33.



We recommend selecting the `Control Apps` before changing any other configurations. Once selected, certain configurations, such as NSB, proportional bands, and deadbands, will be erased and reset to factory default values.

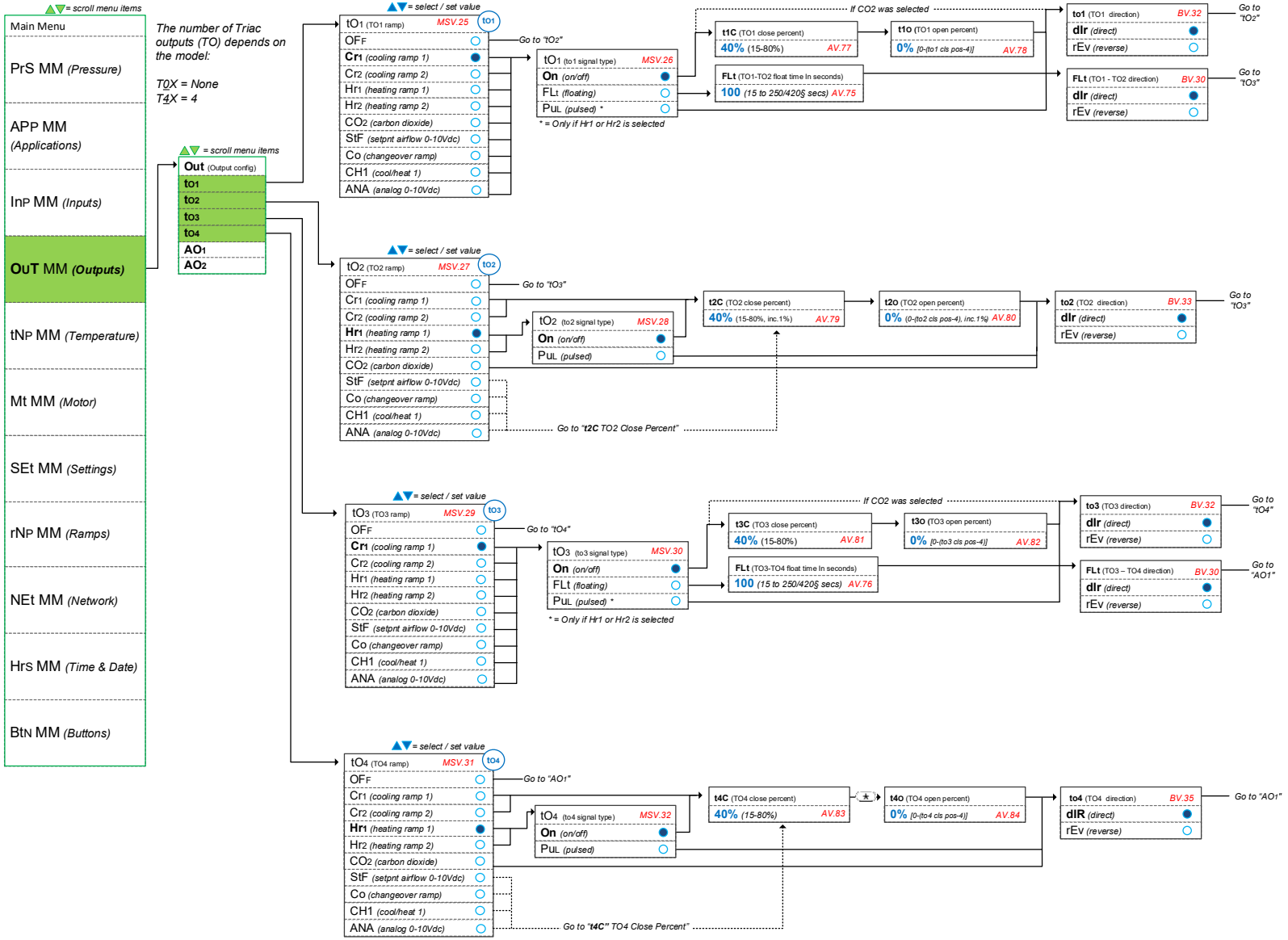
TRL54 Series – Inputs | Menu Overview (2 of 6) | *AI1, AI2, DI1 and DI2*



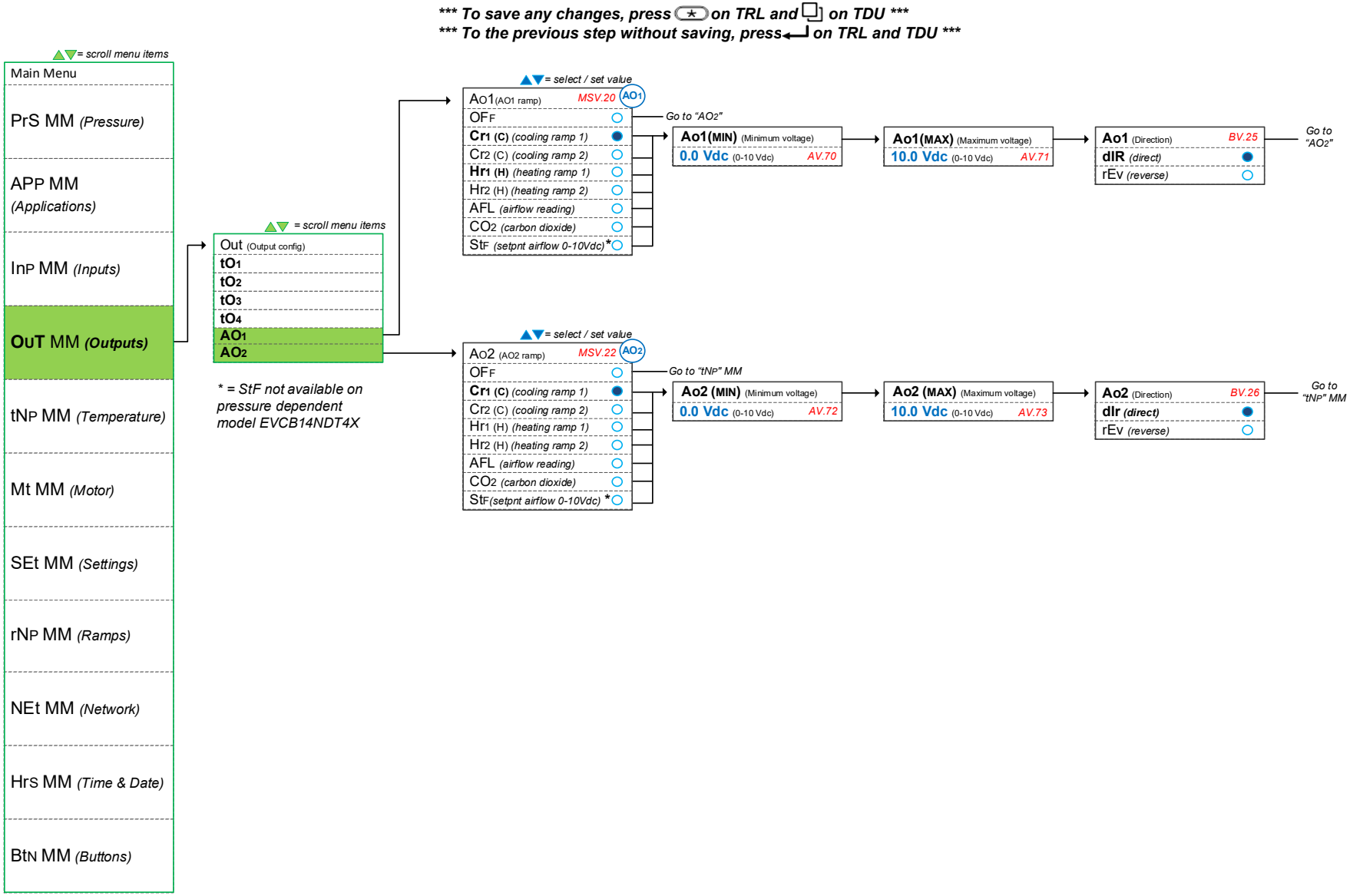
TRL54 Series – TRIAC Outputs | Menu Overview (3 of 6) | *TO1 to TO4*

Main Menu | **Sub Menu** | **Configuration**

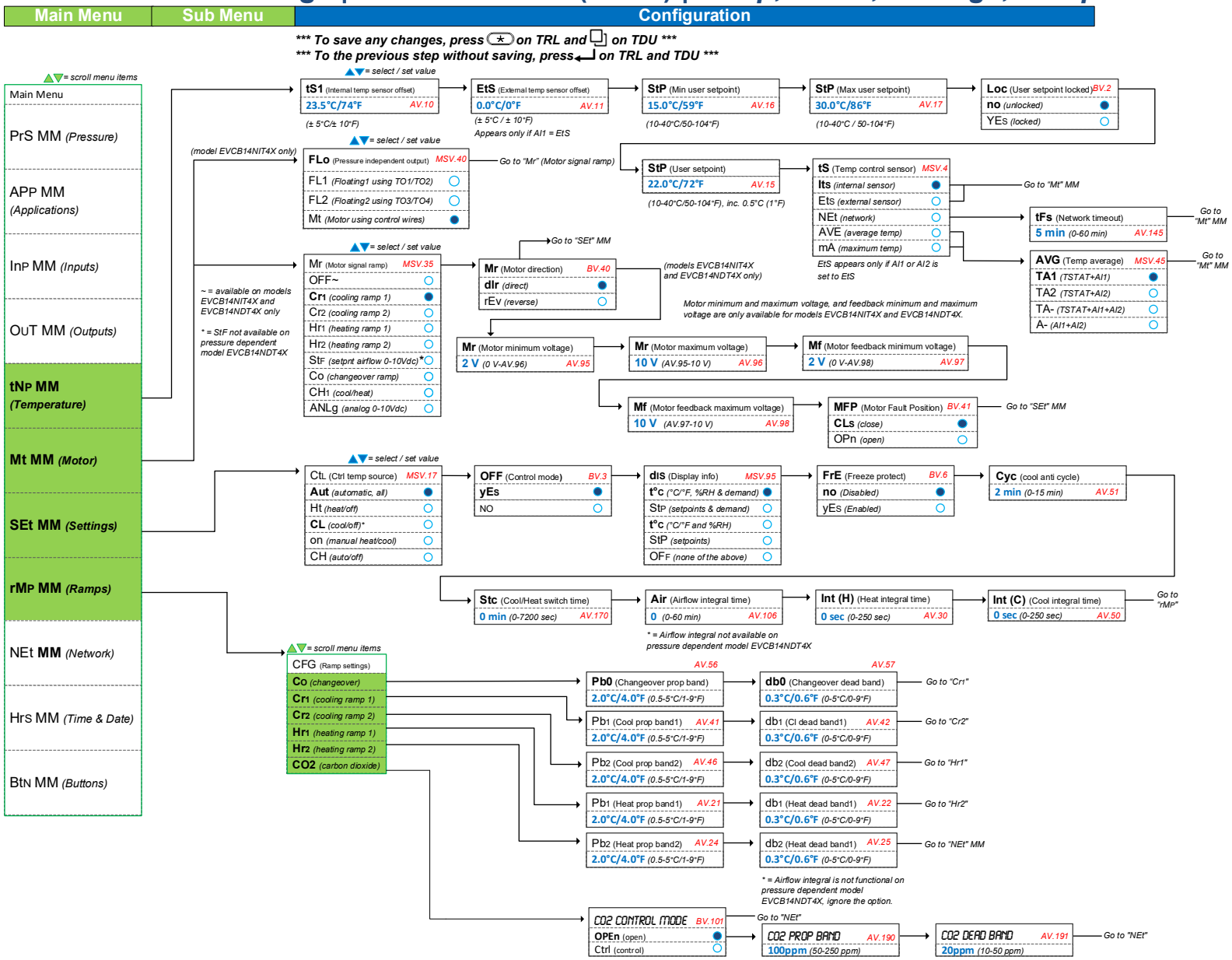
*** To save any changes, press ★ on TRL and ⧉ on TDU ***
*** To the previous step without saving, press ↵ on TRL and TDU ***



TRL54 Series – Analog Outputs | Menu Overview (4 of 6) | *AO1 and AO2*



TRL54 Series – Settings | Menu Overview (5 of 6) | *Temp, Motor, Settings, Ramps*



TRL54 Series – Settings | Menu Overview (6 of 6) | *Network, Buttons, and Options*

Main Menu	Sub Menu	Configuration

*** To save any changes, press ★ on TRL and ⧉ on TDU ***
*** To the previous step without saving, press ↵ on TRL and TDU ***

▲▼= scroll menu items

- Main Menu
- PrS MM *(Pressure)*
- APP MM *(Applications)*
- InP MM *(Inputs)*
- OuT MM *(Outputs)*
- tNP MM *(Temperature)*
- Mt MM *(Motor)*
- SEt MM *(Settings)*
- rNP MM *(Ramps)*
- **NEt MM *(Network)***
- **Hrs MM *(Time & Date)***
- **BtN MM *(Buttons)***

▲▼= scroll menu items

nEt (Network config)
- **tYP** *(Type)*
- **Md** *(Modbus)*
- **bAC** *(BACnet)*
- **CPY** *(copy configuration)*

If type = bAC, menu contains "tYpe", "bAC" and "CPY"

If type = Md, menu contains "tYpe and "Md"

▲▼= select / set value

nEt (Network choice)
- **bAc** *(BACnet)* → Go to "Abr" (BACnet auto baud rate)
- Md *(Modbus)* → Go to "Abr" (Modbus auto baud rate)

▲▼= select / set value

Abr (Modbus auto baud rate)
- No *(Manual)*
- **Yes** *(Automatic)*

bAu (Modbus baud rate)
- **57.6k** *(9.6k, 19.2k, 38.4, 57.6k)*

Modifiable only if Auto Baud Rate set to "No".

CFG (Modbus comport config)
- **nP2** *(no parity, 2 stop bits)*
- EP1 *(even parity, 1 stop bit)*
- OP1 *(odd parity, 1 stop bit)*

MA (Modbus address)
- **1** *(1-246)*

Modifiable only if all DS2 DIP switches are set to OFF.

Go to "HrS" MM

▲▼= select / set value

Abr (BACnet auto baud rate)
- No *(Manual)*
- **Yes** *(Automatic)*

bAu (Bacnet baud rate) *1001*
- **76.8k** *(9.6k, 19.2k, 38.4, 76.8k)*

Modifiable only if Auto Baud Rate set to "No".

Add (MSTP MAC address) *1000*
- **0** *(0-254)*

Modifiable only if all DS2 DIP switches are set to OFF.

M (MSTP MAX master)
- **127** *(1-127)*

Go to "CPY"

▲▼= select / set value

Add (Start address)
- **0** *(0-254, inc.1)* AV.165

Add (End address)
- **0** *(0-254: max=start + 63)* AV.166

Cpy (Confirm copy config) BV.90
- **nO** Copy *(cancel)*
- YES Copy *(confirm)*

Go to "Hrs" MM

Copy Config
- **in** *(in progress)*

SCd (Config succeed)
- *(done)* AV.167

Go to "HrS"

Refer to Copy Config Annnex for a complete list of messages and error codes.

▲▼= select / set value

tF (Set time display format)
- **24** *(24-hour format)*
- 12 *(AM/PM format)*

Hrs (Hours) *Local Time*
- **12** *(1-24 or 1-12 am/pm)*

MI (Minutes) *Local Time*
- **00** *(00-59)*

yr (Year) *Local Date*
- **15** *(15-99)*

Mo (Month) *Local Date*
- **1** *(1-12)*

dAy *Local Date*
- **1** *(1-31)*

Go to "BtN"

▲▼= select / set value

BLK (Bottom left key locked)
- **NO**
- YES

ULK (Upper left key locked)
- **NO**
- YES

AK (Arrows key locked)
- **NO**
- YES

Go to "PrS"

Operation Mode Menus

This menu is accessible through normal operation mode. The Mode Selector jumper (JP1) of the digital room sensor must be set to the "RUN" position (Operation Mode). Refer to Wiring on page 5.

Note Since the action buttons are different on TRL and TDU digital room sensor series, both buttons have been included in the instructions. Refer to the Action Buttons on Digital Room Sensor section to know and use the button as available on your digital room sensor.

1. Press the [✱ / ⧉] and ↵ buttons simultaneously for 5 seconds. The "Enter Password" screen appears.
2. Enter the password within 1 minute by using the arrow keys to increase or decrease the value and the [✱ / ⧉] and ↵ keys to toggle between the digits.
   a. Password **372** = Temperature Offset Menu
   b. Password **637** = Network Settings Menu
   c. Password **757** = Airflow Balance Mode
3. If you enter the wrong password, the digital room sensor displays "**Eror**" and returns to Operation Mode. The digital room sensor will return to normal mode if you navigate through the entire menu and do not make any selection, or if you do not press any key for 5 minutes. The changed values will be saved automatically.

Menu 372 – Temperature Offset – TRL24/TDU and TRL54

1. "INTERN TEMP SENSOR OFFSET" | "TS1" (temperature sensor offset)

Range:	10 to 40ºC	[50 to 104ºF]
Offset:	Max ± 5ºC	
Increment:	0.1ºC	[0.2ºF]

Compare the displayed temperature reading with a known value from a digital room sensor. To offset or calibrate the sensor, use the arrows key to set the desired temperature reading. This is useful for digital room sensors installed in areas where the temperature read is slightly different than the room's actual temperature. For example, a digital room sensor placed right under the air diffuser.

If the digital room sensor is set to use an external temperature sensor (**EtS**), the digital room sensor displays "OFF".

2. "EXTERN TEMPER SENSOR OFFSET" | "ETS" (external temperature sensor offset)

Range:	0 to 50ºC	[41 to 122ºF]
Offset:	Max ± 5ºC	
Increment:	0.1ºC	[0.2ºF]

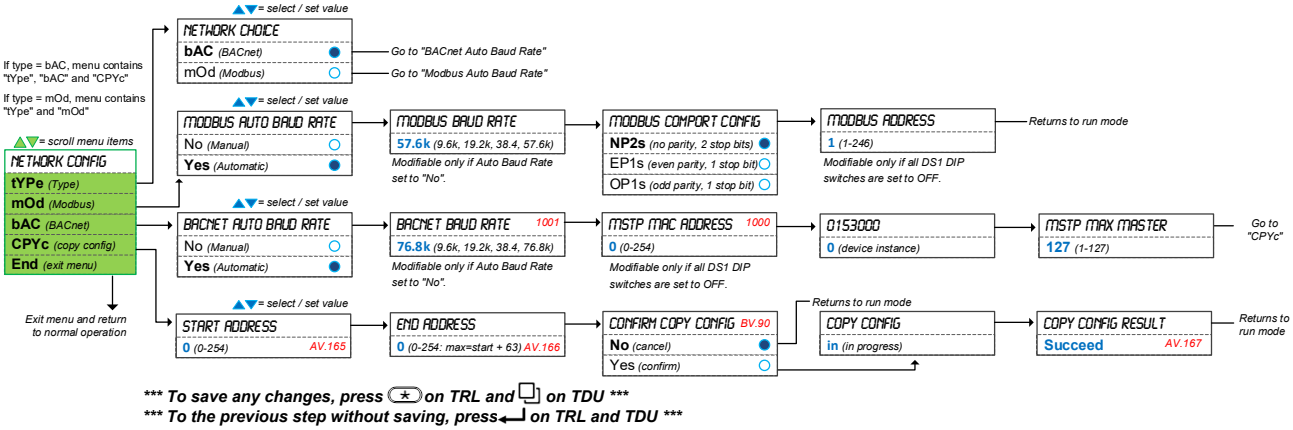
This option appears if you've set one of the analog inputs to **EtS** (External temperature sensor). When the digital room sensor is connected to the appropriate analog input, the display shows the temperature read by the external temperature sensor. Adjust the offset by comparing it with a known value (e.g. thermometer). If the sensor is not connected or short circuited, then the unit displays the sensor's limit.

3. "INPUT3 READING" | "PRS" (input 3 reading)

Range:	250mV (0") to 4000mV (1")

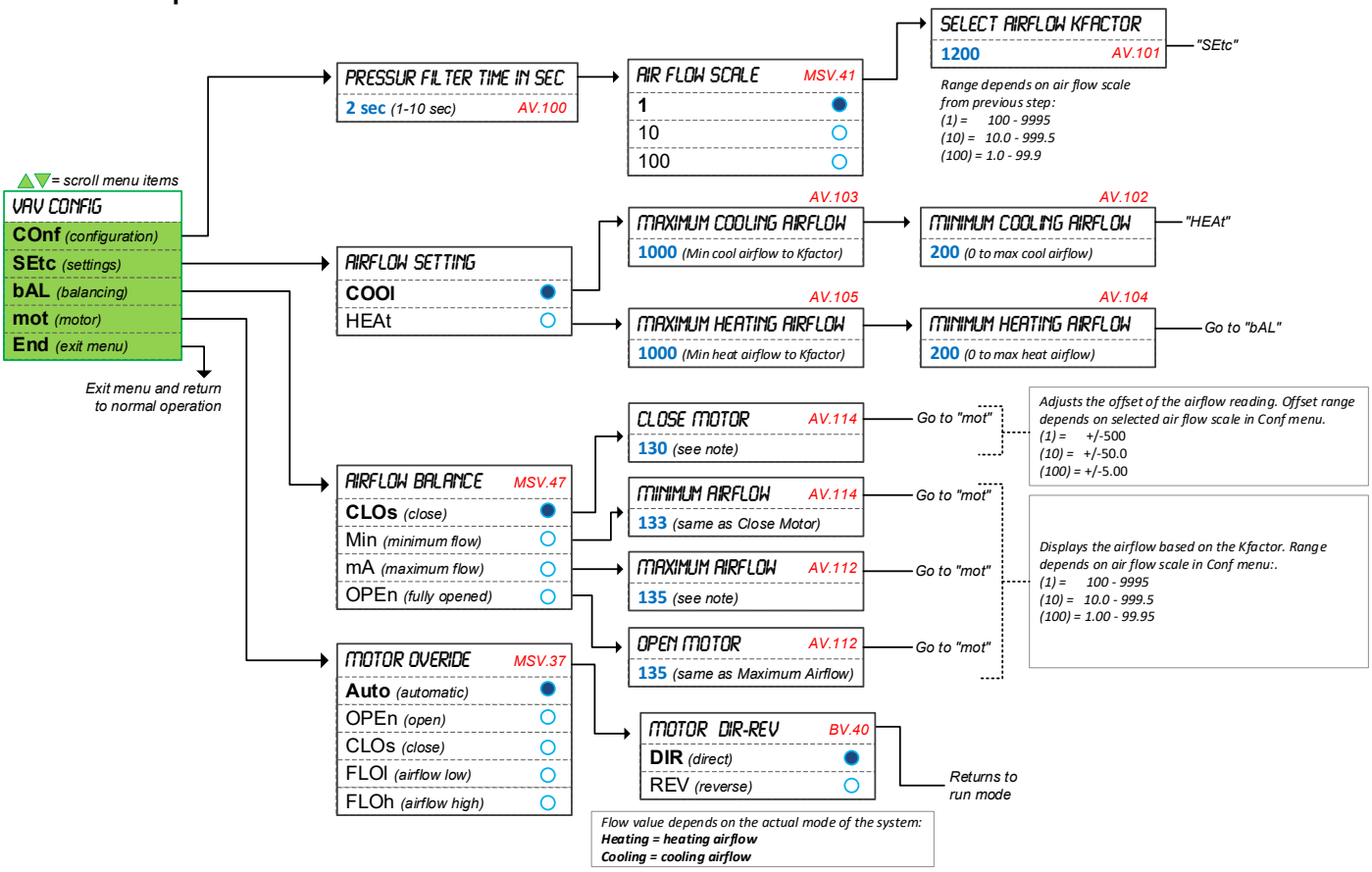
Displays the voltage output value in mV of the pressure sensor. Does not appear for EVCB14NDT4X (pressure dependent) model.

Menu 637 – Network Settings - TRL24 and TDU



Menu 757 – Airflow Balance Mode - TRL24 and TDU

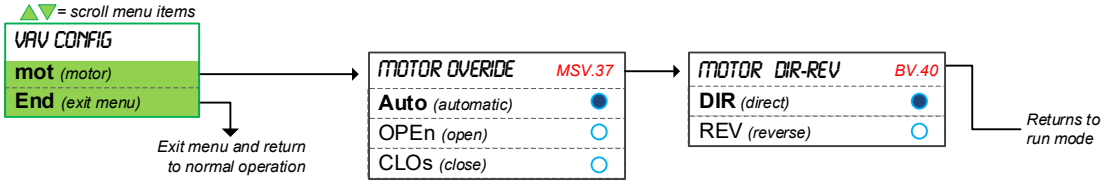
Pressure independent models: EVCB14NIT0X and EVCB14NIT4X



*** To save any changes, press ★ on TRL and ⧉ on TDU ***
*** To the previous step without saving, press ↵ on TRL and TDU ***

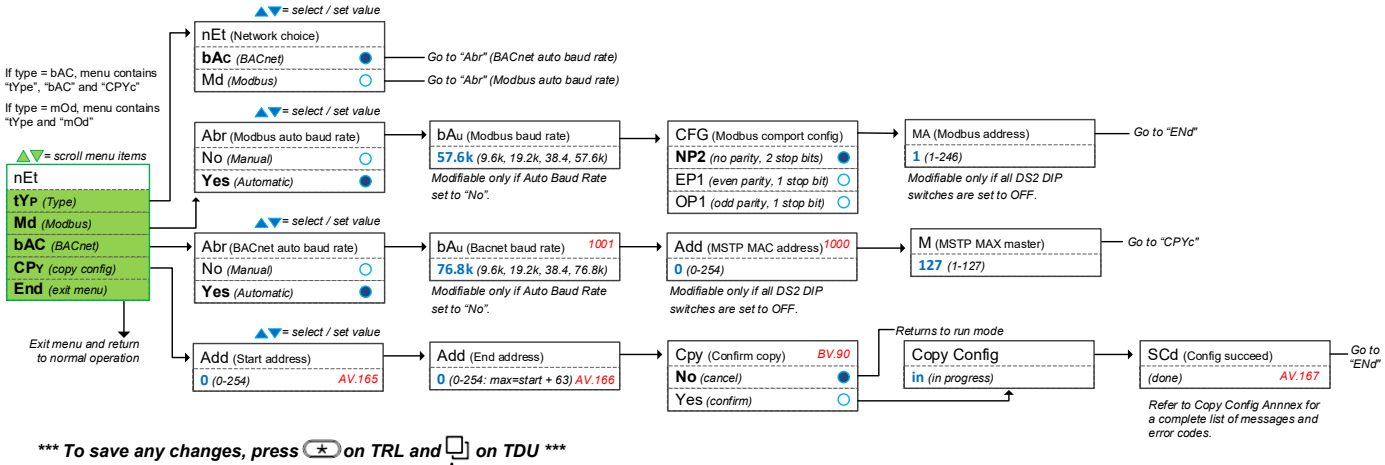
Note: Refer to EVCB-Airflow Balance Instructions on Neptronic website for further information on airflow balancing function.

Pressure dependent model: EVCB14NDT4X



*** To save any changes, press ★ on TRL and ⧉ on TDU ***
*** To the previous step without saving, press ↵ on TRL and TDU ***

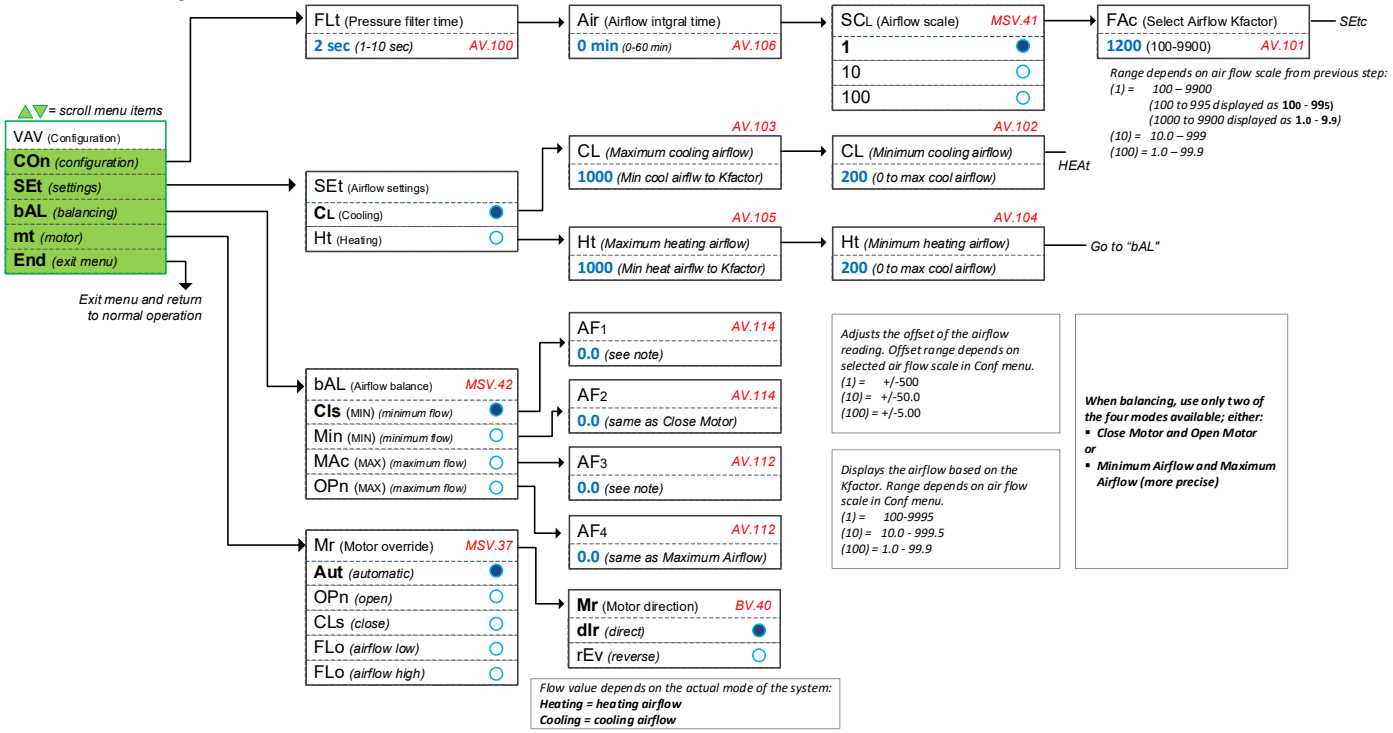
Menu 637 – Network Settings - TRL54



**** To save any changes, press ★ on TRL and ⧉ on TDU ****
**** To the previous step without saving, press ↵ on TRL and TDU ****

Menu 757 – Airflow Balance Mode - TRL54

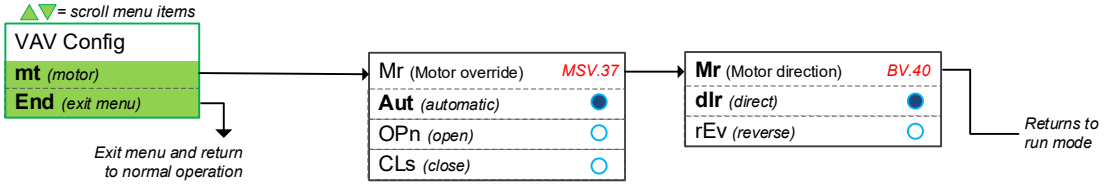
Pressure Independent: model EVCB14NIT4X



**** To save any changes, press ★ on TRL and ⧉ on TDU ****
**** To the previous step without saving, press ↵ on TRL and TDU ****

Note: Refer to EVCB-Airflow Balance Instructions on Neptronic website for further information on the airflow balancing function.

Pressure Dependent: model EVCB14NDT4X or other models if in pressure dependent mode



**** To save any changes, press ★ on TRL and ⧉ on TDU ****
**** To the previous step without saving, press ↵ on TRL and TDU ****

Reset to Factory Default Settings

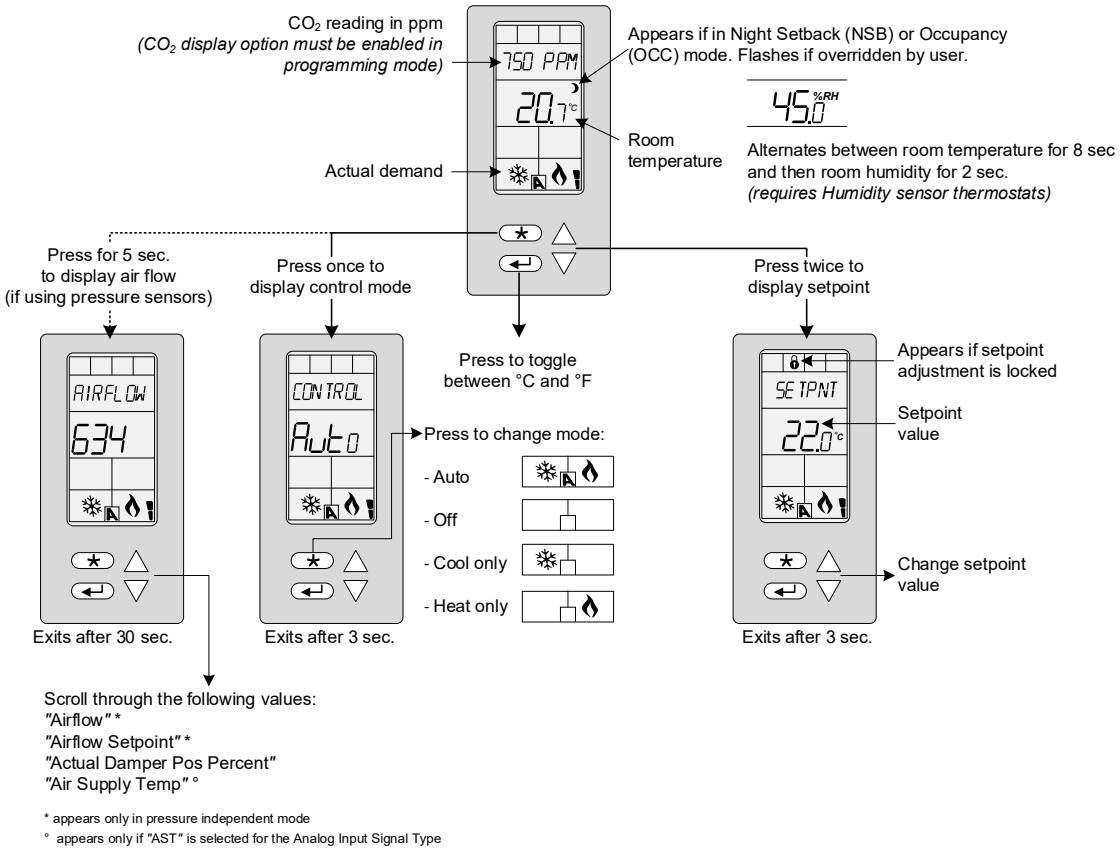
⚠	**This will erase all actual configurations and replace them with the factory default settings.**

1. The Mode Selector jumper (JP1) of the digital room sensor must be set to the “RUN” position (Operation Mode). Refer to **Error! Reference source not found.** on page 5.
2. During the power up sequence of the controller and digital room sensor, press and hold both the ↵ and ▼keys.
3. The “Enter Password” screen appears. Enter **372** within 1 minute by using the arrow keys to increase or decrease the value and the **[** ⊛ / ❑ **]** and ↵ keys to toggle between the digits.
4. Use the arrow keys to select YES and then press **[** ⊛ / ❑ **]**

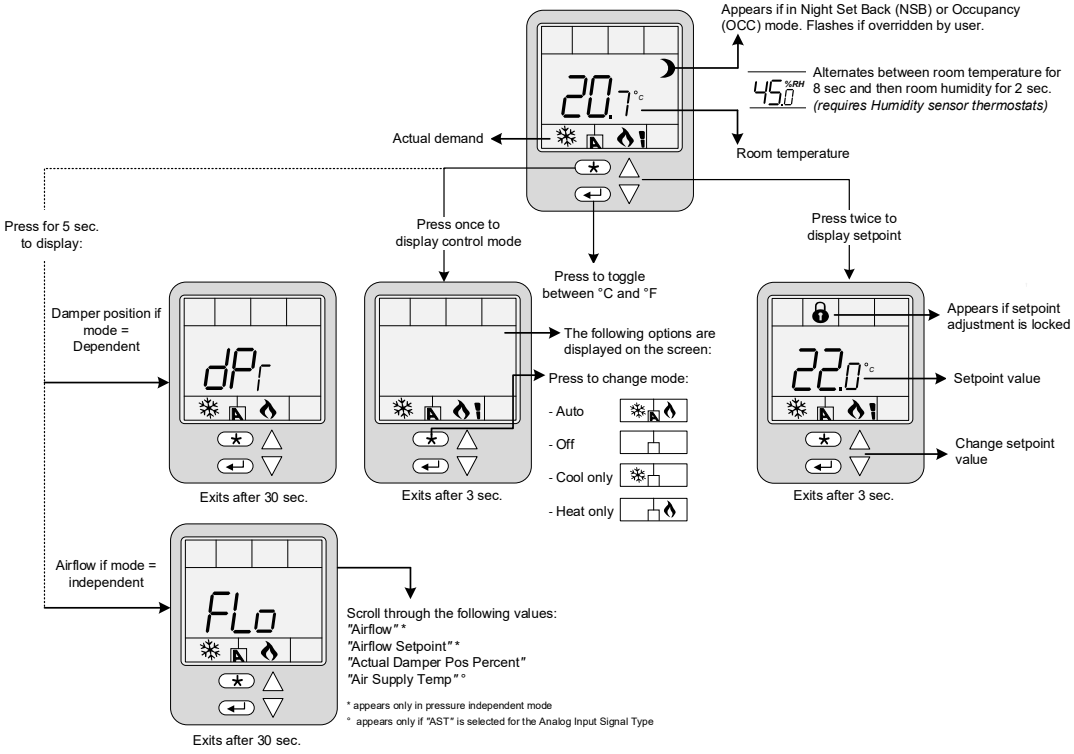
Operation Mode

The Mode Selector Jumper (JP1) of the digital room sensor must be set to the “RUN” position (Operation Mode). Refer to Wiring on page 5.

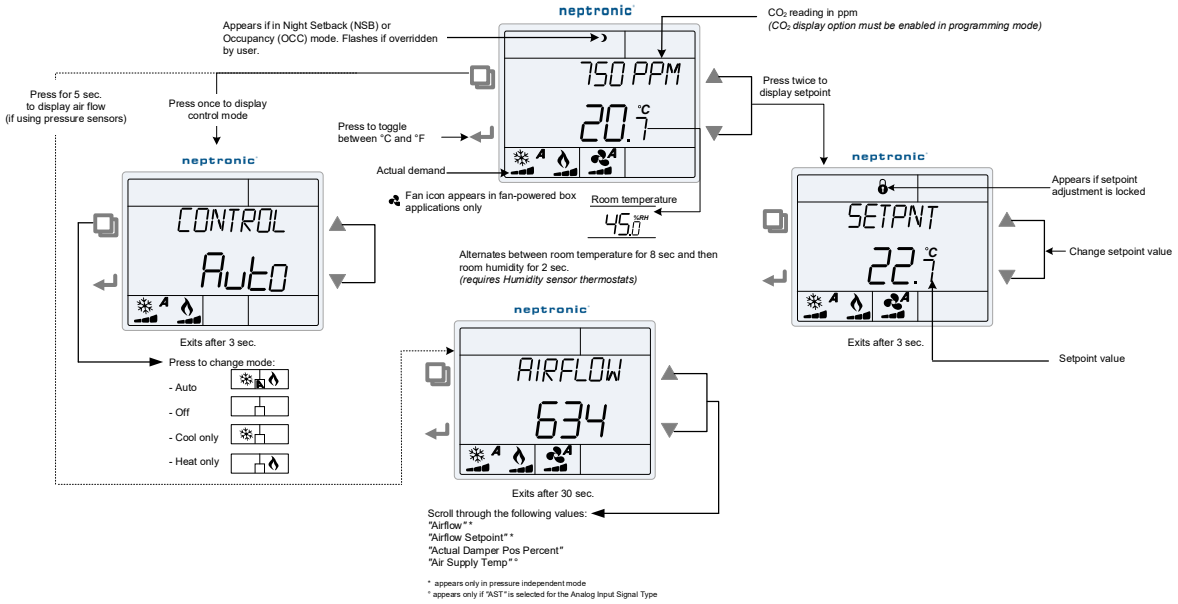
TRL24 - Runtime User Interface



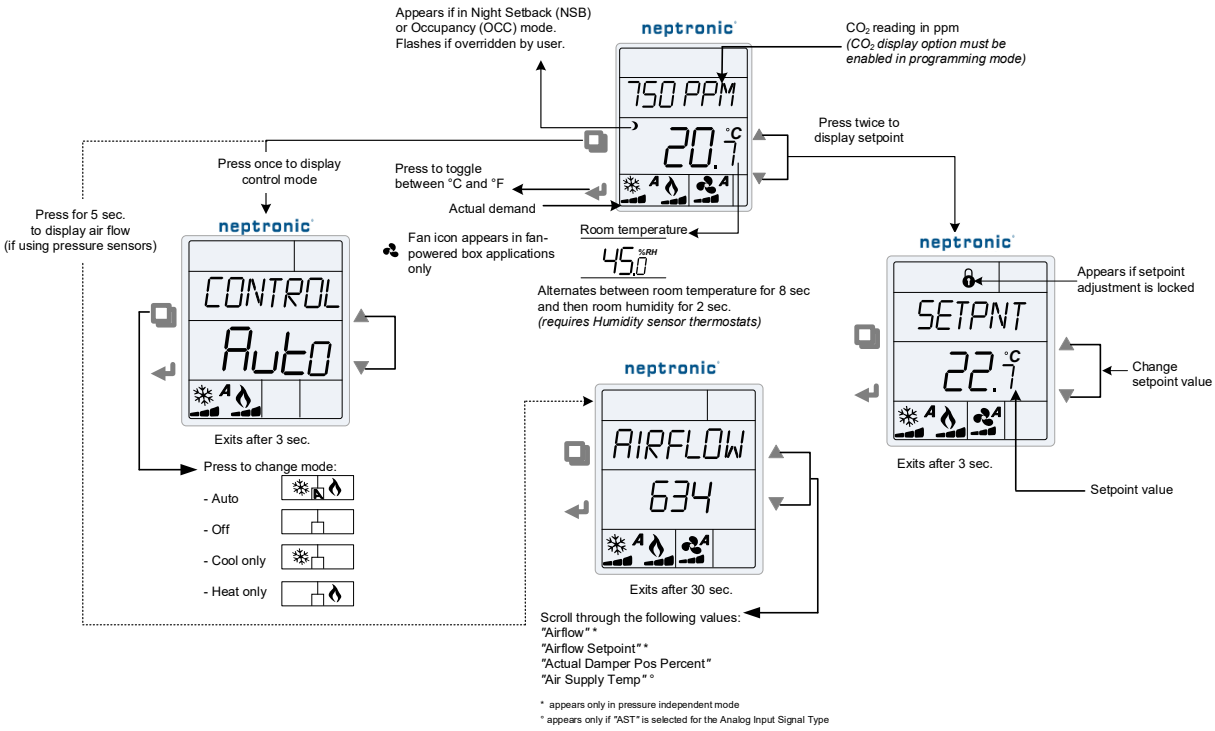
TRL54 - Runtime User Interface



TDU10 / TDU40 / TDU70 Series - Runtime User Interface



TDU00 / TDU30 / TDU60 Series - Runtime User Interface



Operation Mode Settings

Power Up

Upon power up, the LCD illuminates and all segments appear for 2 seconds. The digital room sensor then displays its current version of the digital room sensor for 2 seconds followed by the current version of the controller for 2 seconds. Pressing any key on the digital room sensor illuminates the LCD for 4 seconds.

CO_2 (Digital Room Sensors with CO_2)

If enabled via the configuration menu, the digital room sensor displays the CO_2 reading on the first line above the temperature reading. If CO_2 display is enabled, the time will not be displayed.

Select Temperature Scale

To toggle the temperature scale between ºC and ºF, press the ↵ button.

Temperature Display and Setpoint

If enabled in the *"Display Info"* menu of the *Temp, Motor, and Settings of TRL24 and TRL54 on pages 17 and 24*, the digital room sensor displays the temperature reading for 8 seconds
If the sensor is disconnected or short circuited, then the unit displays the sensor's limit.
To display the setpoint, press the ▲ or ▼ key twice. The setpoint appears for 3 seconds.
To adjust the setpoint, press the arrow keys while the temperature is displayed. If the setpoint adjustment has been locked "Setpnt Locked", option in **Temperature settings** (TRL/TDU menus on page 17 and 24), the lock 🔒 symbol appears.

Humidity

If enabled in the *"Options"* menu of the Buttons and Options of TRL24 on page 19), the digital room sensor displays the temperature reading for 8 seconds and then displays the humidity reading for 2 seconds.
If the sensor is disconnected or short circuited, then the unit displays the sensor's limit.

Airflow and Air Supply Temperature

Press and hold the **[** ✱ / ❑ **]** key for 5 seconds and use the arrow keys to view the "airflow", "airflow Setpnt", "actual damper pos percent" and "air Supply Temp". After 30 seconds without any action, the digital room sensor returns to operation mode.
The air supply temperature appears only if analog input AI1 or AI2 are configured with the AST option.
Not available on the following pressure dependent model *EVCB14NDT4X.*

Control Mode

To access the Control Mode, press the **[** ✱ / ❑ **]** key. The Control Mode appears for 3 seconds.

Press the **[** ✱ / ❑ **]** key to scroll through the following control modes. These options can vary depending on the options selected in "Temp Control Mode" and "Enable OnOff Control Mode".

- Auto (Automatic Cooling or Heating)
- OFF (if it is not disabled in Programming Mode)
- Cooling only (on, with cooling symbol)
- Heating only (on, with heating symbol)

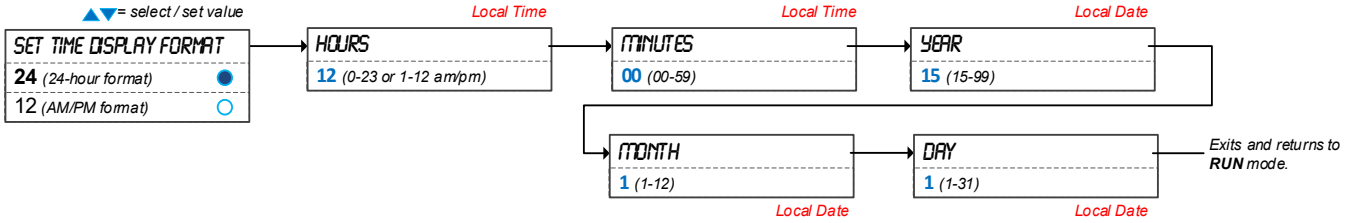
Night Setback (NSB) or Occupancy Mode

This function is only available if you set DI1 to **nSb** (Night setback contact) or **Occ** (occupancy mode). If the DI1 contact is triggered, the digital room sensor enters NSB or No Occupancy Mode (the ☽ symbol appears) and uses the NSB or OCC heating and cooling setpoints.

If not locked, you can override the night setback or no occupancy mode for a predetermined period by pressing any of the 4 buttons. During the override period the ☽ symbol will flash. If the ☽ symbol does not flash, the override period is finished or the night setback or no occupancy override has been locked in programming mode.

Set Time and Date

1. Ensure that JP1 on the digital room sensor is set to Run.
2. Press and hold the ↵ key for 5 seconds
3. Use the arrow keys to set the desired value. Press the **[** ✱ / ❑ **]** key to save and got to the next step. Press the ↵ key to go to the previous step without saving.



*** To save any changes, press ★ on TRL and ⧉ on TDU ***
*** To the previous step without saving, press ↵ on TRL and TDU ***

Annex A: Control Apps

Refer to Pressure and Applications menus of TRL24/TDU and TRL54 on pages 13 and 20 for more information. The available **Control Apps** vary according to the model.

Description	CL (cool only)	CLHt (cool/heat)	CHrH (cool/heat/reheat)	CO_2 (CO_2)
Min. Setpoint	**20°C (68°F)**	**20°C (68°F)**	**20°C (68°F)**	**20°C (68°F)**
Max. Setpoint	**28°C (82°F)**	**28°C (82°F)**	**28°C (82°F)**	**28°C (82°F)**
Changeover Setpnt	24°C (75°F)	**20°C (68°F)**	**20°C (68°F)**	**20°C (68°F)**
TO1 Ramp	**HR1**	CR1	**HR1**	CR1
TO1 Signal Type	On/Off	On/Off	On/Off	On/Off
TO1 Close Pos.	40%	40%	40%	40%
TO1 Open Pos.	0%	0%	0%	0%
TO2 Ramp	HR1	HR1	HR1	**CO_2**
TO2 Signal Type	**Pulse**	On/Off	**Pulse**	On/Off
TO2 Close Pos.	40%	40%	40%	40%
TO2 Open Pos.	0%	0%	0%	0%
TO3 Ramp	**HR2**	**CR2**	**HR2**	**HR1**
TO3 Signal Type	On/Off	On/Off	On/Off	On/Off
TO3 Close Pos.	40%	40%	40%	40%
TO3 Open Pos.	0%	0%	0%	0%
TO4 Ramp	**HR2**	**HR2**	**HR2**	**HR1**
TO4 Signal Type	**Pulse**	On/Off	**Pulse**	On/Off
TO4 Close Pos.	40%	40%	40%	40%
TO4 Open Pos.	0%	0%	0%	0%
Motor Ramp	CR1	**COr**	**COr**	**COr**
AO1 ramp	**HR1**	CR1	**HR1**	CR1
AO2 Ramp	**HR2**	HR1	**HR2**	HR1
AI1 Input	OFF	**SENS**	**SENS**	**SENS**
AI2 Input	OFF	OFF	OFF	**CO_2**
DI1 Input	**nSb.o**	**nSb.o**	**nSb.o**	Occ.o
Heat Prop Band 2	2°C (4°F)	2°C (4°F)	2°C (4°F)	2°C (4°F)
Heat Deadband 2	**1.3°C (2.6°F)**	**1.3°C (2.6°F)**	**1.3°C (2.6°F)**	**1.3°C (2.6°F)**
Cool Deadband 2	**1.3°C (2.6°F)**	**1.3°C (2.6°F)**	**1.3°C (2.6°F)**	**1.3°C (2.6°F)**

Legend

Grey Text = Standard default value
Bold Text = Special default value for selected application

HR = Heating ramp
CR = Cooling ramp
COr = Changeover ramp
SENS = Changeover temperature sensor
Fan ON = Fan powered box in continuous mode
Fan Auto = Fan powered box in automatic mode (follows demand)
nSb.o = Night Setback (normally open)
Occ.o = Occupancy mode (normally open)

TO = TRIAC output
AO = Analog output
AI = Analog input
DI = Digital input

Notes

	Recycling at end of life: please return this product to your Neptronic local distributor for recycling. If you need to find the nearest Neptronic authorized distributor, please consult **www.neptronic.com**.



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