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TROX® TECHNIK

Automation and System Technology

ComControl

LON-WA TDC

Plug-In User Manual

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1. Introduction

In this handbook the LNS-based TROX LON-WA TDC01 plug-in for the LON-WA TDC module will be described. The installation and operation of the plug-in will be documented in detail.
Moreover, the network variables and configuration parameters of the LON objects will be explained.

The LON-WA TDC module serves for the temperature-sensitive control of air diffusers.
The discharge direction of the air diffusers is altered in relation to the duct and room temperature in order to establish comfortable conditions in occupied spaces.

With the help of the plug-in, the necessary configurations for the LON module can be executed in a simple and user-friendly manner.

The temperature-sensitive control can be realized with the DUK, QSH-ISH, VD, VDR, VDL, and DG-VAR air diffusers.
The technical data on the air diffusers can be found in the corresponding documentation.

The available applications (xif/apb-file) as well as the plug-in for the LON-WA TDC can be downloaded from the internet.

Please visit our website and catch up with recent news at www.trox.de.

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Version: March 2006

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2. Installation: Plug-In

The requirements and the steps for installation are explained in the following.

2.1 System Requirements

The TROX LON-WA TDC01 plug-in is a LNS-compliant plug-in based on the standard of the Lonmaker 3 network management tool.
Before you install the plug-in on your PC, please review the following system requirements:

- PC — recommended: Pentium III 1 GHz or faster
- Operating System — Microsoft® Windows® 2000® Microsoft Windows XP®
- RAM Storage — min. 256 MB
- Hard Disc Storage — min. 30 MB
- Screen — Super VGA (1024x768)
- LNS — Version 3 with Service Pack 8 or higher

2.2 Installation: Plug-In

Before the plug-in can be installed, the Device Resource Files should be checked.

2.2.1 Device Resource Files (DRF)

The definitions of the various network variable types are stored in the Resource Files.
Standard network variables are exclusively used with the application for the LON-WA TDC so that no manufacturer-specific definitions need be used.
Current LonMark Device Resource Files (data version 12.0 or higher) must, however, be installed on the PC.

2.2.2 Installation

In order to install the plug-in, start the set-up program (Setup). Follow the instructions given there and the set-up program will install the required data automatically on your PC and will place the “TROX LNS PlugIn’s” program group under *Windows/Start upMenu/Programs*. The installation path given should be followed.

2.2.3 Registration

The one-time registration of the plug-in must be conducted on the PC.
If the plug-in is not registered during the installation, it is possible to register it later.
In order to do so, select the WA TDC01.exe program under *Windows-Start/Programme/TROX LNS PlugIn`s/WA_TDC_01* and complete the registration according to the program instructions.
Registration is necessary for the plug-in to be available in the network management tool.

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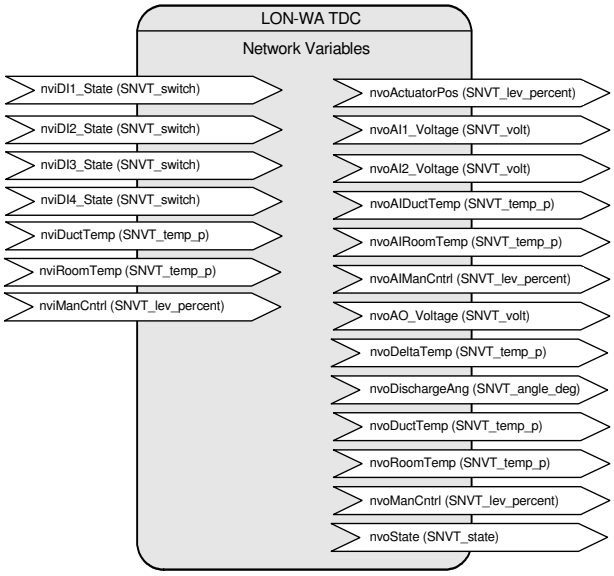
3. Description: Function Object

The LON node consists of a node object and a virtual functional block. The VFB objects consist of network variables and configuration parameters. All variables and parameters are based on standard network variables (SNVT), which guarantees the easy integration of the LON-WA TDC in a LonWorks network.

3.1 Network Variables



nviDI1_State
SNVT Type: SNVT_switch
Function:
The switching input serves for the manual control of the air diffuser. With this input, the discharge direction is set to 100% (cold air).

Value	State	Function
0.0	0	not set
100.0	1	set

nviDI2_State
SNVT Type: SNVT_switch
Function:
The switching input serves for the manual control of the air diffuser. The isothermal discharge direction is set with this input.

Value	State	Function
0.0	0	not set
100.0	1	set

nviDI3_State
SNVT Type: SNVT_switch
Function:
The switching input serves for the manual control of the air diffuser. With this input, the discharge direction is set to 0% (warm air).

Value	State	Function
0.0	0	not set
100.0	1	set

nviDI4_State
SNVT Type: SNVT_switch
Function:
The switching input serves for the manual control of the air diffuser. With this input, two functions can be selected and set.
- variable operation (specifies a setpoint for the discharge angle)
- Warm-up mode

Value	State	Function
0.0	0	not set
100.0	1	set

The necessary configurations are made on the “I/O Config” tab.

nviDuctTemp
SNVT Type: SNVT_temp_p
Function:
Actual value duct temperature via LON.

nviRoomTemp
SNVT Type: SNVT_temp_p
Function:
Actual value room temperature via LON.

nviManCntrl
SNVT Type: SNVT_lev_percent
Function:
A variable discharge angle can be specified via LON with nviManCntrl within the range of the defined operating area (see “main” tab).

nvoActuatorPos
SNVT Type: SNVT_ lev_percent
Function:
Output of the current actuator set position.

nvoAI1_Voltage
SNVT Type: SNVT_volt
Function:
Output of the AI1 analogue input voltage (duct temperature).

nvoAI2_Voltage
SNVT Type: SNVT_volt
Function:
Output of the AI2 analogue input voltage (room temperature or variable operation)

nvoAIDuctTemp
SNVT Type: SNVT_temp_p
Function:
Output of the current value for the duct temperature with the AI1 analogue input.

nvoAIRoomTemp
SNVT Type: SNVT_temp_p
Function:
Output of the current value for the room temperature with the AI2 analogue input.

nvoAIManCntrl
SNVT Type: SNVT_lev_percent
Function:
Output of the set position for the discharge angle for variable operation. The specification is made via analogue input AI2.

nvoAO_Voltage
SNVT Type: SNVT_volt
Function:
Output of analogue output voltage.

nvoDeltaTemp
SNVT Type: SNVT_temp_p
Function:
Output of temperature differential
(Δt = duct temperature – room temperature).

nvoDischargeAng
SNVT Type: SNVT_angle_deg
Function:
Output of air diffuser discharge angle.

nvoDuctTemp
SNVT Type: SNVT_temp_p
Function:
Output of current duct temperature.

nvoRoomTemp
SNVT Type: SNVT_temp_p
Function:
Output of current room temperature.

nvoManCntrl
SNVT Type: SNVT_lev_percent
Function:
Output of the set point for the discharge angle for variable operation. Specification either via LON or the AI2 analogue input.

nvoState
SNVT Type: SNVT_state
Function:
Issues current status messages.

Bit	Type of Operation	0	1
0	Status DI1	not set	set
1	Status DI2	not set	set
2	Status DI3	not set	set
3	Status DI4	not set	set
4	Status DO1	not set	set
5	Status DO2	not set	set
6	ManCntrlCooling	not set	set
7	ManCntrlIsotherm	not set	set
8	ManCntrlHeating	not set	set
9	ManCntrlVariable	not set	set
10	WarmUp	not set	set
11		not set	set
12		not set	set
13		not set	set
14		not set	set
15		not set	set

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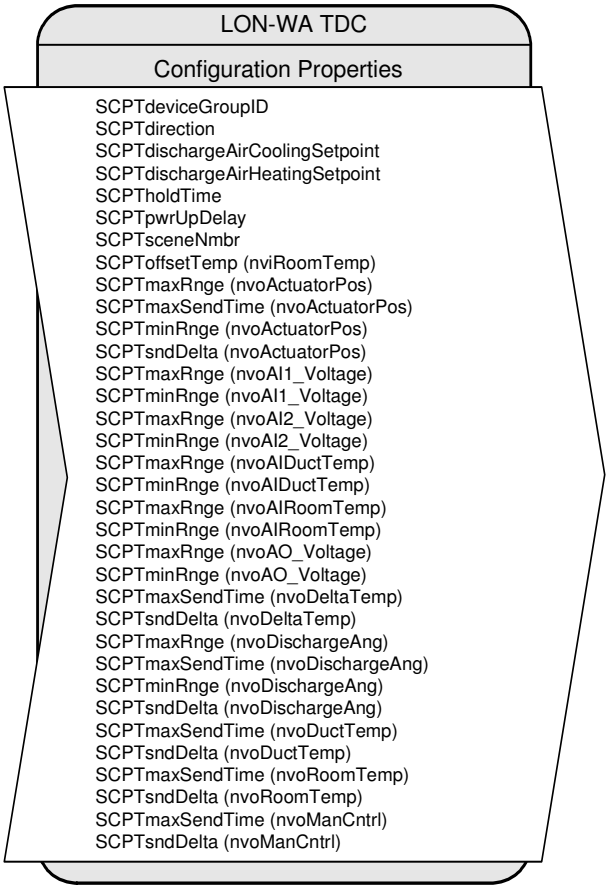
3.2 Configuration Parameters



SCPTdeviceGroupID
SCPT Type: SCPT_deviceGroupID
Function:
There are various actuators available (3 point, continuous, LON) for the temperature-sensitive control of the air diffusers. The appropriate actuator can be selected for each air diffuser with the configuration parameters. The selection can be made on the “main” tab in the plug-in.

No	Type of Operation	No	Type of Operation
1	DUK-E2-160	15	VDL-E2
2	DUK-E2-200	16	VDL-E3
3	DUK-E2-250	17	VDL-E4
4	DUK-E2-315	18	VD-E2
5	DUK-E2-400	19	VD-E3
6	DUK-E3	20	VD-E4
7	DUK-E5-160	21	VDR-E2
8	DUK-E5-200	22	VDR-E3
9	DUK-E5-250	23	VDR-E4
10	DUK-E5-315	24	ISH / QSH-E2
11	DUK-E5-400	25	ISH / QSH-E3
12	DUK-E6	26	ISH / QSH-E4
13	DUK-E10	27	DG-VAR
14	DUK-E11	28	

SCPTdirection
SCPT Type: SCPT_direction
Function:
Configuration of possible input and output assignments. The configurations can be made on the “I/O Config” tab.

Bit	Type of Operation	0	1
0	DuctTemp AI1	not set	set
1	RoomTemp AI2	not set	set
2	RoomTemp LON	not set	set
3	ManCntrlCooling DI1	not set	set
4	ManCntrlCooling LON	not set	set
5	ManCntrlIsotherm DI2	not set	set
6	ManCntrlIsotherm LON	not set	set
7	ManCntrlHeating DI3	not set	set
8	ManCntrlHeating LON	not set	set
9	ManCntrlVariable DI4	not set	set
10	ManCntrlVariable LON	not set	set
11	WarmUp AI2	not set	set
12	WarmUp LON	not set	set
13	ManCntrlVarSetpt AI2	not set	set
14	ManCntrlVarSetpt LON	not set	set
15		not set	set

Comment:
If both bits 1 and 2 are set, the room temperature will be constant.

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SCPTdischargeAirCoolingSetpoint
SCPT Typ: SCPT_dischargeAirCoolingSetpoint
Function:
DeltaT1 temperature differential between the duct and the room temperature up to which the discharge direction is set to 100% (cold air). For DeltaT1 input, see the "main" tab in the plug-in.

SCPTdischargeAirHeatingSetpoint
SCPT Typ: SCPT_dischargeAirHeatingSetpoint
Function:
DeltaT2 temperature differential between the duct and the room temperature where an isothermal discharge direction is set. For DeltaT2 input, see the "main" tab in the plug-in.

SCPTholdTime
SCPT Typ: SCPT_maxSendTime
Function:
Automatic time reset (in minutes) for the warm-up function.

SCPTpwrUpDelay
SCPT Typ: SCPT_pwrUpDelay
Function:
Time interval (in hours) after which the actuator (3 point) will be automatically synchronized.

SCPTsceneNmbr
SCPT Typ: SCPT_sceneNmbr
Function:
Output program version

SCPToffsetTemp (nviRoomTemp)
SCPT Typ: SCPT_ offsetTemp
Function:
Specifies internal set-point temperature at constant room temperature.

SCPTmaxRnge (nvoActuatorPos)
SCPT Typ: SCPT_maxRnge
Function:
Maximum range for actuator position.

SCPTmaxSendTime (nvoActuatorPos)
SCPT Typ: SCPT_maxSendTime
Function:
Time interval after which the setpoint for the actuator position will be newly sent.

SCPTminRnge (nvoActuatorPos)
SCPT Typ: SCPT_minRnge
Function:
Minimum range for actuator position.

SCPTsndDelta (nvoActuatorPos)
SCPT Typ: SCPT_sndDelta
Function:
Output tolerance for a change in actuator position.

SCPTmaxRnge (nvoAI1_Voltage)
SCPT Typ: SCPT_ maxRnge
Function:
Maximum voltage value for the AI1 analogue input.

SCPTminRnge (nvoAI1_ Voltage)
SCPT Typ: SCPT_minRnge
Function:
Minimum voltage value for the AI1 analogue input.

SCPTmaxRnge (nvoAI2_Voltage)
SCPT Typ: SCPT_ maxRnge
Function:
Maximum voltage value for the AI2 analogue input.

SCPTminRnge (nvoAI2_ Voltage)
SCPT Typ: SCPT_minRnge
Function:
Minimum voltage value for the AI2 analogue input.

SCPTmaxRnge (nvoAIDuctTemp)
SCPT Typ: SCPT_ maxRnge
Function:
Duct temperature measuring range –- maximum value.

SCPTminRnge (nvoAIDuctTemp)
SCPT Typ: SCPT_minRnge
Function:
Duct temperature measuring range –- minimum value.

SCPTmaxRnge (nvoAIRoomTemp)
SCPT Typ: SCPT_ maxRnge
Function:
Room temperature measuring range –- maximum value.

SCPTminRnge (nvoAIRoomTemp)
SCPT Typ: SCPT_minRnge
Function:
Room temperature measuring range –- minimum value.

SCPTmaxRnge (nvoAO_Voltage)
SCPT Typ: SCPT_ maxRnge
Function:
Maximum voltage value analogue output

SCPTminRnge (nvoAO_Voltage)
SCPT Typ: SCPT_minRnge
Function:
Minimum voltage value analogue output

SCPTmaxSendTime (nvoDeltaTemp)
SCPT Typ: SCPT_maxSendTime
Function:
Time interval after which the temperature differential will be newly sent.

SCPTsndDelta (nvoDeltaTemp)
SCPT Typ: SCPT_sndDelta
Function:
Output tolerance for a change in temperature differential.

SCPTmaxRnge (nvoDischargeAng)
SCPT Typ: SCPT_maxRnge
Function:
Maximum range for discharge angle (upper limit operating area)

SCPTmaxSendTime (nvoDischargeAng)
SCPT Typ: SCPT_maxSendTime
Function:
Time interval after which the discharge angle will be newly sent.

SCPTminRnge (nvoDischargeAng)
SCPT Typ: SCPT_minRnge
Function:
Minimum range for discharge angle (lower limit operating area)

SCPTsndDelta (nvoDischargeAng)
SCPT Typ: SCPT_sndDelta
Function:
Output tolerance for a change in discharge angle.

SCPTmaxSendTime (nvoDuctTemp)
SCPT Typ: SCPT_maxSendTime
Function:
Time interval after which the duct temperature will be newly sent.

SCPTsndDelta (nvoDuctTemp)
SCPT Typ: SCPT_sndDelta
Function:
Output tolerance for a change in duct temperature.

SCPTmaxSendTime (nvoRoomTemp)
SCPT Typ: SCPT_maxSendTime
Function:
Time interval after which the room temperature will be newly sent.

SCPTsndDelta (nvoRoomTemp)
SCPT Typ: SCPT_sndDelta
Function:
Output tolerance for a change in room temperature.

SCPTmaxSendTime (nvoManCntrl)
SCPT Typ: SCPT_maxSendTime
Function:
Time interval after which the setpoint of the discharge angle for variable operations will be newly sent.

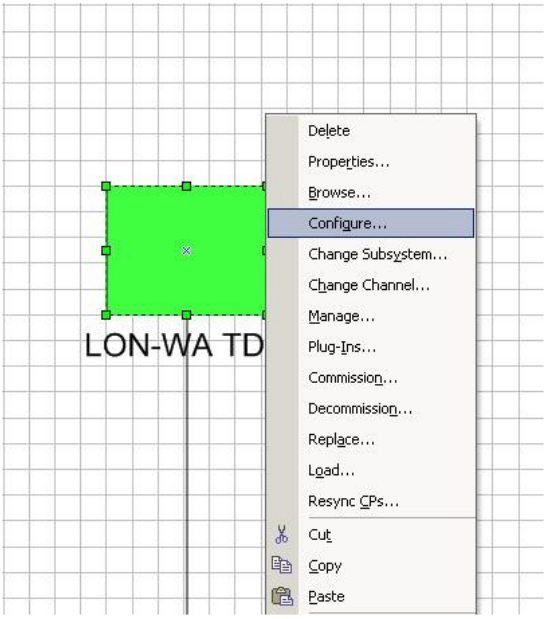
SCPTsndDelta (nvoManCntrl)
SCPT Typ: SCPT_sndDelta
Function:
Output tolerance for a change in discharge angle for variable operation.

4. Description: Plug-In

The TROX LON-WA TDC01 plug-in has a total of seven tabs. You can find a detailed description of the individual tabs in chapter 4.2.

4.1 Start: Plug-In

The plug-in is started with the respective *Device* in the Lonmaker network management tool. In order to do so, one should select the node with the mouse: the "configure" menu item can be started with the right mouse button.
The plug-in will be newly started for each individual LON node, i.e. one can gain access to the currently updated node with the plug-in.



Only one plug-in may be opened at one time.

4.2 Description of the Tabs

In the next chapters, the individual tabs with their functions will be described in detail.

Plug-in configuration changes must either be confirmed or rejected. To this end, there are two buttons on each tab.

Apply
If new parameters are to be sent to the controller, "apply" must be pressed.

Cancel
If the old parameters are to be restored, the process must be cancelled with “cancel”.

4.2.1 "Main" Tab

Basic configurations for the control of the air diffusers are made on the "main" tab. It is possible to define characteristics for the discharge angle and the operating area in dependence upon the temperature differential between the room temperature and the duct temperature.

1: Configuration

- Diffuser Type

With this selection box, one can select an air diffuser with its corresponding actuator.

- Version

Display version number.

- DeltaT actual

Display current temperature differential between the room temperature and the duct temperature.

- DischargeAngle actual

Display current discharge angle

Characteristics for discharge angle / temperature differential

- Techn. Max

Maximum discharge angle (cold air) depending upon the air diffuser selected. The max. value is automatically set and cannot be configured.

- Techn. Min

Minimum discharge angle (warm air) depending upon the air diffuser selected. The min. value is automatically set and cannot be configured.

- Techn. Center

Discharge angle for introducing isothermal air. The angle is automatically set and cannot be configured.

- Max (100%)

Maximum limit of the discharge angle in the operating range (cold air). The definition of the operating range allows, where necessary, the technically possible discharge angles to be limited.

- Min (0%)

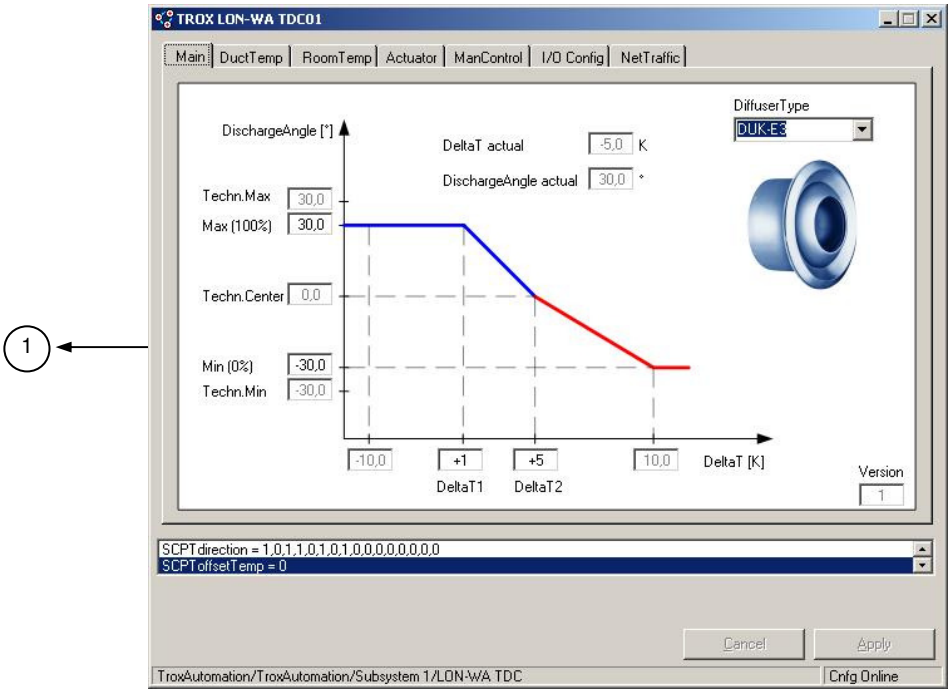
Minimum limit of the discharge angle in the operating range (warm air). The definition of the operating range allows, where necessary, the technically possible discharge angles to be limited.

- DeltaT1

Input temperature differential between the duct and the room temperature up to which the discharge direction is set to 100% (cold air).

- DeltaT2

Input temperature differential between the duct and the room temperature where an isothermal discharge direction is set.
The range for the temperature differential lies between -10/+10 K and cannot be configured.



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4.2.2 "DuctTemp" Tab

The duct temperature can be configured on the "DuctTemp" tab. The duct temperature can be specified for the LON-WA TDC either with a LON signal or as analogue voltage signal. The signal is set on the "I/O Config" tab.

1: Configuration of the analogue input signal AI1/duct temperature

- Min Voltage

Minimum voltage value for the AI1 analogue input.

- Max Voltage

Maximum voltage value for the AI1 analogue input.

- Actual

Display of the current input voltage on the AI1 analogue input.

- Min DuctTemp

Duct temperature that corresponds with the minimum voltage value.

- Max DuctTemp

Duct temperature that corresponds with the maximum voltage value.

- AI1 DuctTemp

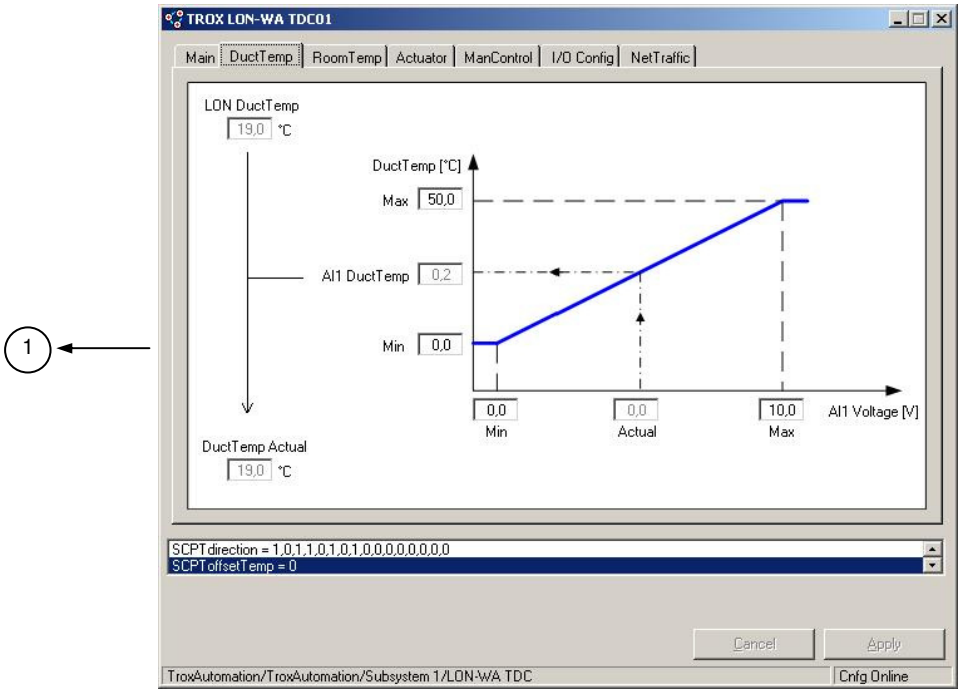
Display of the duct temperature with the AI1 analogue input.

- LON DuctTemp

Display of the duct temperature with LON.

- DuctTempActual

Display of the current duct temperature (either with LON or AI1).



4.2.3 "RoomTemp" Tab

The room temperature can be configured on the "RoomTemp" tab. The room temperature can be specified for the LON-WA TDC either with a LON signal, as analogue voltage signal or as constant temperature. The signal is set on the "I/O Config" tab.

1: Configuration of the analogue input signal for AI2/room temperature

- Min Voltage

Minimum voltage setpoint for the AI2 analogue input.

- Max Voltage

Maximum voltage setpoint for the AI2 analogue input.

- Actual

Display of the current input voltage on the AI2 analogue input.

- Min RoomTemp

Room temperature that corresponds with the minimum voltage value.

- Max RoomTemp

Room temperature that corresponds with the maximum voltage value.

- AI2 RoomTemp

Display of the room temperature with the AI2 analogue input.

- LON RoomTemp

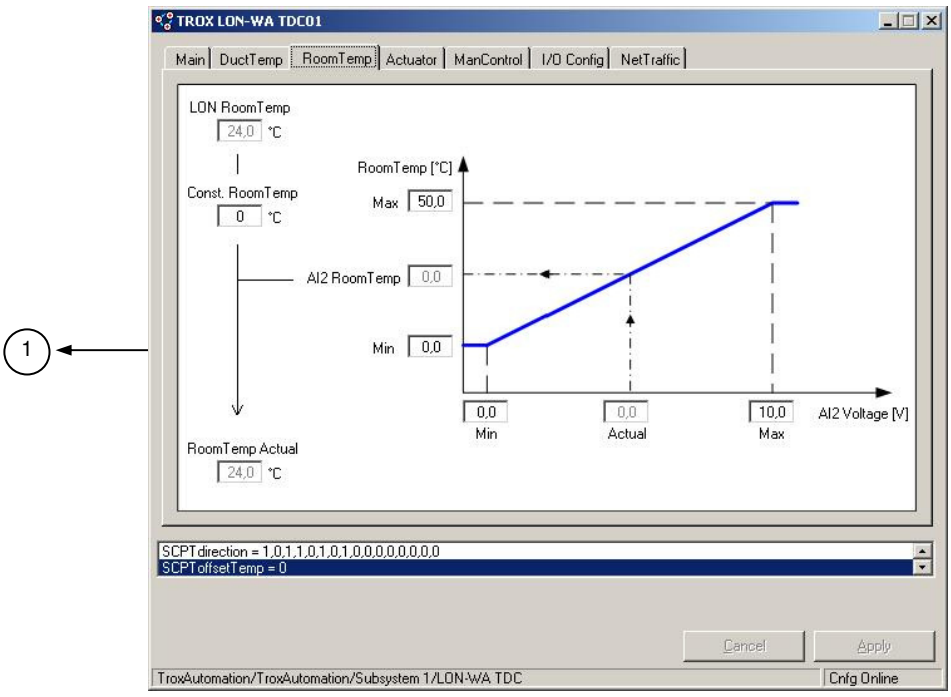
Display of the room temperature with LON.

- Const. RoomTemp

Input of a constant room temperature.

- RoomTempActual

Display of the current room temperature (either with LON, constant, or with AI2).



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4.2.4 "Actuator" Tab

The necessary configurations for the corresponding actuators of the air diffusers can be made on the "actuator" tab.
Depending on the air diffuser selected, either the frame for the continuous actuator or the frame for the 3 point actuator will be activated.

1: General

- Position Setpoint

Display of the current actuator position setpoint.

- Limit Max

Maximum range for actuator position. Where necessary, the maximum actuator position can be limited.

- Limit Min

Minimum range for actuator position. Where necessary, the minimum actuator position can be limited.

2: Continuous Actuator

- AO Voltage

Display of the current output voltage on the AO analogue output.

- Limit Max

Maximum voltage value analogue output

- Limit Min

Minimum voltage value analogue output

- WarmUp Time

When using air diffusers with continuous actuators, it is possible to enable warm-up function. In the warm-up mode, a certain number of air diffusers will be closed, while others distribute the air vertically (warm air) with maximum penetration depth. The room will therefore be effectively flushed with air as quickly as possible in order to establish a comfortable room temperature.
The WarmUp Time configuration parameter offers the possibility of automatically resetting the warm-up function. After this time elapses, it will automatically switch back to normal operation.

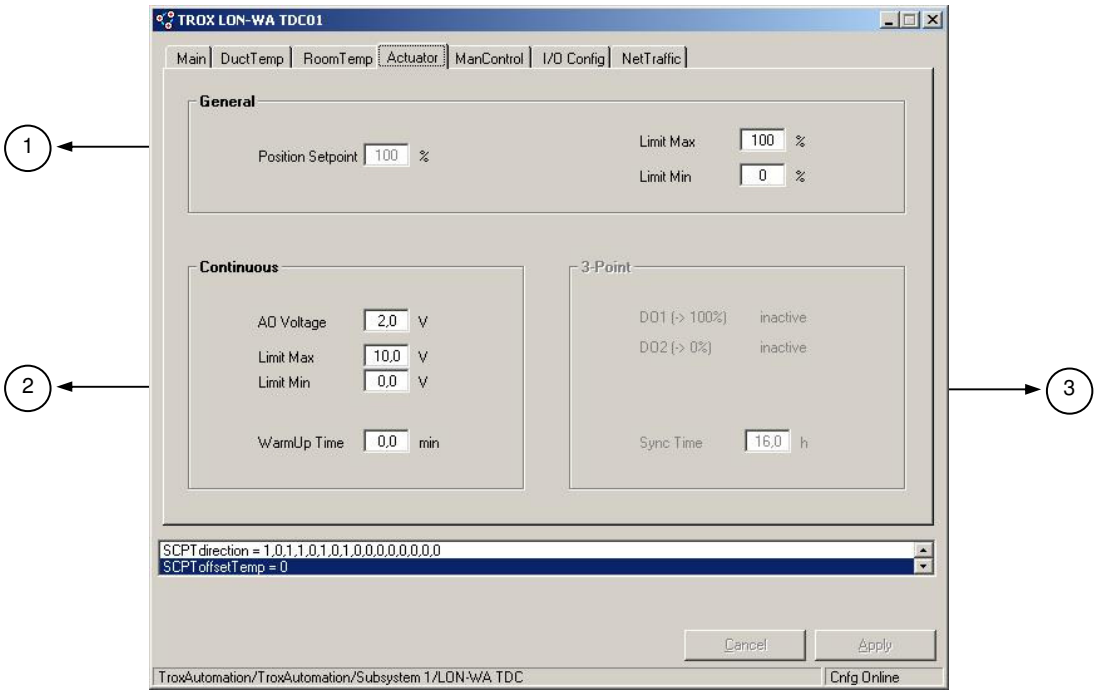
3: 3-point actuator

- DO1 / DO2

Displays whether the 3-point actuator is moved to "open" by the relay DO1 (100%) or "closed" by the relay DO2 (0%).

- Sync Time

After the set time expires, the actuator (at 100% position) will be synchronized (default setting 16 hours). The actuator will also be synchronized if the actuator angle position is less than 10° (0% position) or greater than 90° (100% position).



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4.2.5 "ManControl" Tab

When controlling the air diffuser, it is possible to manually override the temperature-sensitive control function. The necessary configurations are made on the "I/O Config" tab. Whether or not the control function override is activated will be displayed on the "ManControl" tab. Setting is made via LON or digital input.

1: Cooling
Displays whether the discharge direction of 100% (cold air) is specified with LON or DI1 digital input.

2: Isotherm
Displays whether the isothermal discharge direction of 100% (cold air) is specified with LON or DI2 digital input.

3: Heating
Displays whether the discharge direction of 0% (warm air) is specified with LON or DI3 digital input.

4: Variable
It is also possible with LON or the DI4 digital input to specify variable operation for the control of the air diffuser.

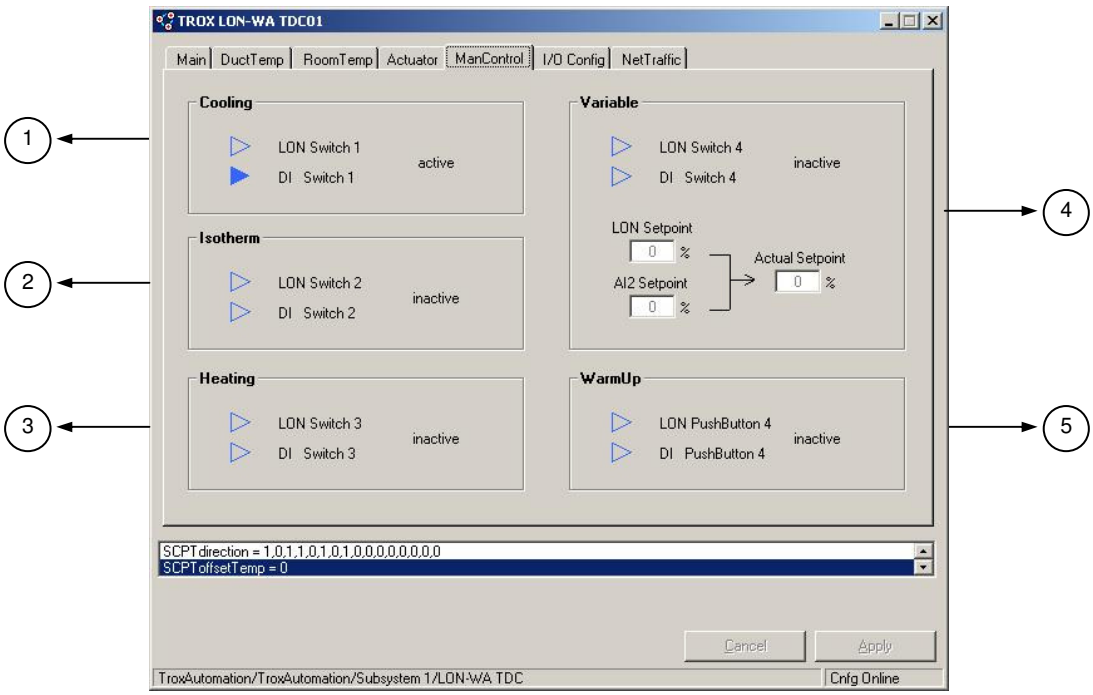
- Displays whether variable control is specified with LON or DI4 digital input.

- LON Setpoint
Displays setpoint position for variable operation with LON.

- AI2 Setpoint
Displays setpoint position for variable operation with AI2 analogue input.

- Actual Setpoint
Displays current setpoint position for variable operation.

5: WarmUp
Displays whether the warm-up function is specified with LON or DI4 digital input.



4.2.6 "I/O Config" Tab

The necessary configurations for the duct and room temperature as well as the manual override of the control functions can be made on the "I/O Config" tab.

1: DuctTemp
- AI1 / Lon Sensor

Select whether the duct temperature will be connected via the AI1 analogue input or whether a LON signal is available for the temperature.

2: RoomTemp
- AI2 / Lon Sensor / Constant

Select whether the duct temperature will be connected via the AI2 analogue input or whether a LON signal is available for the temperature. Alternatively, the room temperature can be specified as constant (see "RoomTemp" tab).

3: Manual Control

Settings for the override function.
- Cooling

With the selection box, one can choose whether the discharge direction of 100% (cold air) will be specified with LON or DI1 digital input. The simultaneous selection of both switches is possible.

- Isotherm

With the selection box, one can choose whether the isothermal discharge direction of 100% (cold air) will be specified with LON or DI2 digital input. The simultaneous selection of both switches is possible.

- Heating

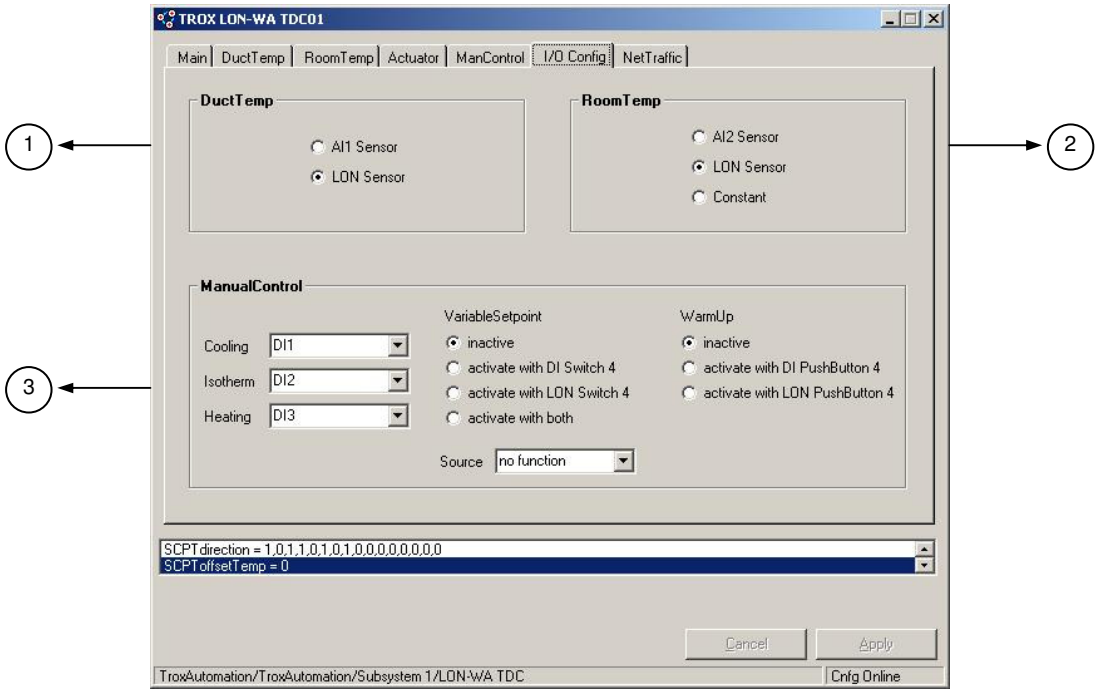
With the selection box, one can choose whether the discharge direction of 0% (warm air) will be specified with LON or DI3 digital input. The simultaneous selection of both switches is possible.

- Variable Setpoint

The source of the signal (AI2 or LON) must be selected first for the variable operation of the air diffusers. The release of the variable operation will either be given by the DI4 switch or via LON. Here, the appropriate selection must be made on the tab.
Please be aware that either room temperature or variable operation can be specified with the AI2 analogue input.

- WarmUp

This function is only available for continuous actuators. The warm-up function can either be set by DI4 or LON. The activation of the function is made by button and not by switch. The button option is necessary so that the warm-up function is automatically reset with WarmUp Time.
Please be aware that either warm-up or variable operation can be specified with the DI4 digital input.

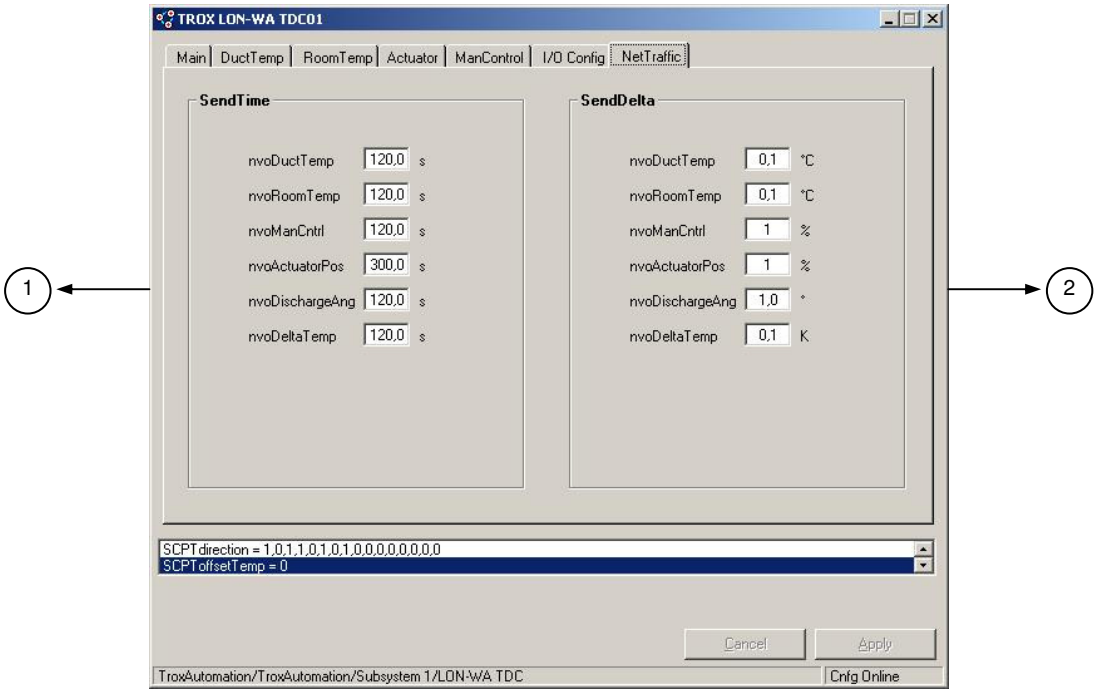


4.2.7 "NetTraffic" Tab

The settings for data transfer to the LonWorks network can be specified on the "NetTraffic" tab.

1: Configuration: SendTime
Time intervals can be configured for the available output variables after which values will be newly sent to the network. It is thereby possible to optimally adapt the LON-WA TDC to the existing bus load.

2: Configuration SendDelta
In addition to the time intervals, output tolerances for the six output variables can be determined when values change. After a change of value that is greater than the defined value, a new value will be sent to the network.



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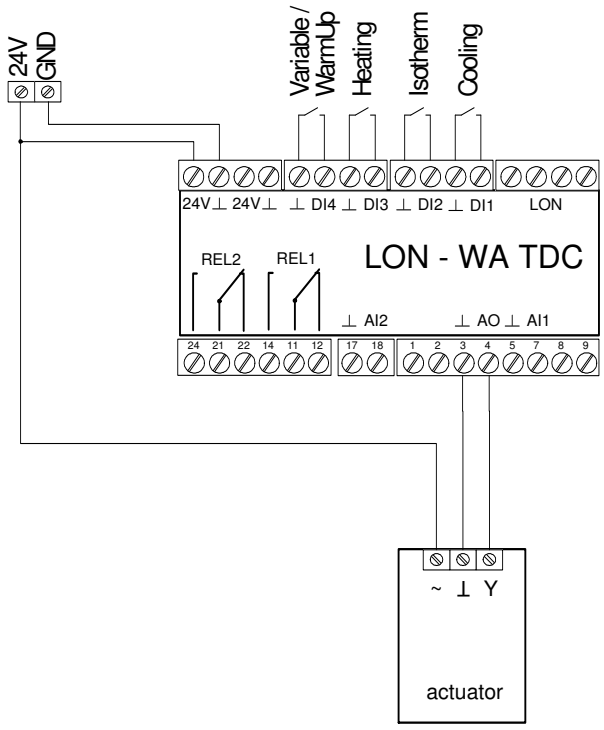
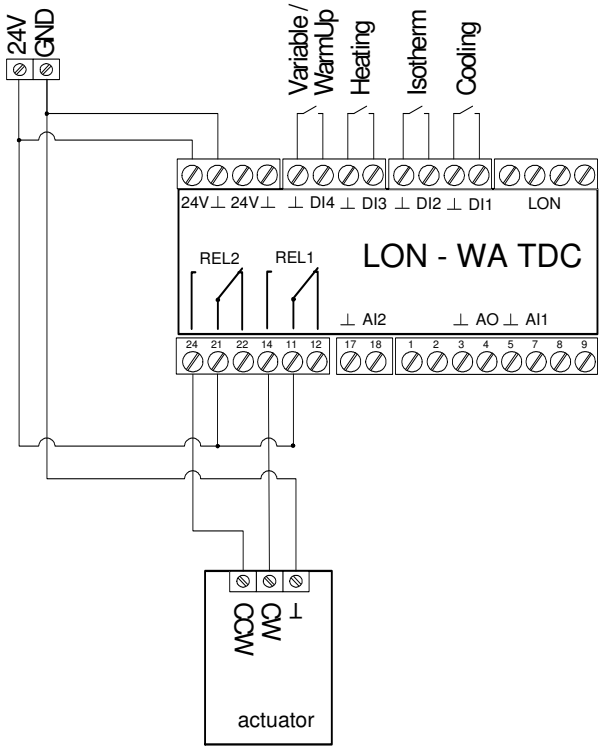
5. Wiring

Wiring example for a diffuser with continuous actuator:



Wiring example for a diffuser with 3-point actuator:



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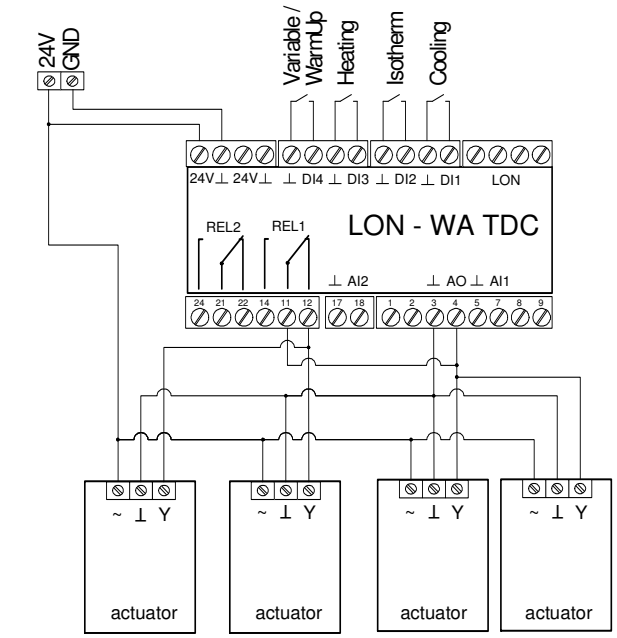
Wiring example for the warm-up mode:



WarmUp: Diffuser closed or in cooling mode

Max. penetration depth