

TROX GmbH

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PI/7.6/1/EN/1



1 Area of application

The LON-WA TDC module is for the temperature-sensitive control of adjustable discharge diffusers when heating and cooling. Depending on the difference between duct temperature and room temperature, the air discharge direction of the air diffusers is changed, so that comfort conditions are achieved when heating or cooling.

The temperature-sensitive control can be achieved with TROX diffusers types DUK, QSH/ISH, VD, VDR, VDL and DG-VAR.

Please refer to respective current leaflets for the technical data on the diffusers.

To implement the functions, standard network variables (SNVT) were exclusively used, so that the LON-WA TDC can be flexibly and easily integrated into the higher-ranking systems.Ø



2 Technical data

Distribution voltage:

24 VAC \pm 15%, 50/60 Hz
Double terminals for looping

Power consumption:

3,5 VA

Inputs:

2 analogue inputs 0 – 10 V DC
4 digital inputs for potential-free switch contacts

Outputs:

1 analogue output 0 – 10 V DC
2 digital outputs (alternating relay)

LON interface:

4 LON terminals
FTT10 free topology

Type of protection:

IP 65

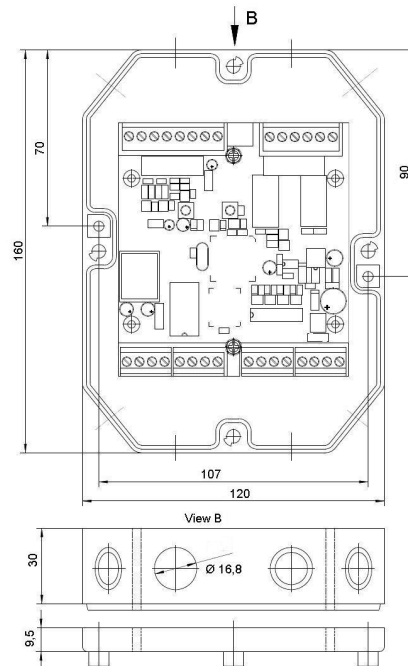
Software application:

The available applications (xif/apb-file) for the LON-WA TDC can be downloaded from the internet at www.trox.de

Terminals:

Supply, bus, digital and analogue signals with screw terminals 90° for 0.08 mm² – 2.5 mm² with voltage reversal protected socket.

Casing:



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Automation / System Technology COMCONTROL LON-WA TDC

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3 Functionality

In rooms with a conventional room height of approx. 3 m, fixed blade diffusers, e.g. swirl diffusers, can be used when cooling and heating. The swirling rotational and horizontal discharged of the supply air ensures high induction, rapid temperature equalisation and quick reduction in the air velocity.

With larger room heights, the penetration depth of the air stream when heating is often not sufficient to create comfort conditions in the occupied zone. With these rooms, adjustable diffusers should be used, which change the discharge direction, depending on the difference between duct and room temperature, so that comfort conditions are achieved when heating and cooling.

With adjustable diffusers, there are three modes of operation depending on the supply air temperature differential namely:

- cooling
- isothermal
- heating

In the case of cooling ($t_{\text{duct}} < t_{\text{room}}$), the cold air must be mixed with the room air as quickly as possible and it must occur outside the occupied zone, so that draughts do not occur. For this purpose, the cold air is discharged horizontally or upwards, so that no draughts occur. Due to its higher density, the cold supply air is heavier than the room air and can therefore penetrate into the occupied zone.

With isothermal air, the duct temperature is the same as the room temperature. For the discharged angle, the middle setting is selected. The air will be inserted in an angle of about 45° based to the ceiling (ceiling diffusers) or horizontal (jet nozzles) in the room and so reaching an optimised mixing with the room air. This will assure an optimized comfort.

In the case of heating ($t_{\text{duct}} > t_{\text{room}}$), the warm air must be discharged vertically/downwards. Otherwise due to its lower density the warm air will not reach the occupied zone and a layer of warm air will occur at ceiling level.

On this basis, the LON-WA TDC module controls the discharge direction of the diffusers, depending on the difference between duct temperature (supply air) and room temperature.

In addition to the supply air temperature difference, the air stream and its distribution in the room are dependent upon additional variables, such as jet velocity (volume flow), room height and distance from the diffuser to the occupied zone.

In order to also make allowance for these variables, it is possible to define a project-specific characteristic curve (discharged angle vs. temperature difference) in the LON-WA TDC module, with two set points (DeltaT1 and DeltaT2). These two set points can be individually adjusted:

Delta T1 is used to specify the temperature difference up to which the discharge angle is set for 100 % cooling

Delta T2 is the point of isothermal operation ie the mid point discharge angle setting.

Diffusers with both continuous operation actuators (0-10 V DC control) and 3-point control actuators (24 V AC) can be controlled, such that the set points and characteristic curves are configured accordingly.

Number of diffusers/actuators:

Max. 20 actuators with 3-point control (...E2/E5)
 (power consumption per actuator max. 4 VA with 24V AC)

Max. 10 continuous operation rotary actuators
 (DUK / VD / VDR / VDL-...-E3, DG-VAR)

Max. 5 continuous operation linear/spindle actuators
 (DUK-...-E6, QSH/ISH-...-E3)

The duct and room temperature can either be specified via a LON signal or as an analogue voltage signal for the LON-WA TDC. With this, there is also the option of defining the room temperature as a constant.

The temperature-sensitive control function can be manually overridden through the override controls, WarmUp, Variable, Heating, Isothermal and Cooling.

With the use of diffusers with a continuous operation actuator, the WarmUp function enables a number of diffusers to be closed/changed to cooling setting which results in a high pressure loss characteristic, so that the volume of air is increased in the remaining diffusers, thus achieving a higher vertical penetration depth.

With the "Variable" override control, the LON or AI2 can be specified with a set value, which results in a set discharge angle on the diffuser, regardless of the current temperature difference.

The override controls, Cooling, Isothermal and Heating result in the discharge angle of the diffusers to be set to 100 % cooling, isothermal or 100 % heating point.

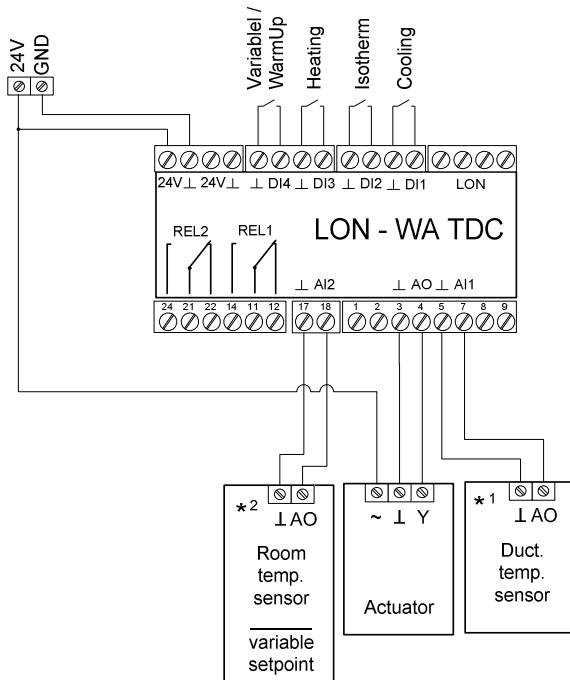
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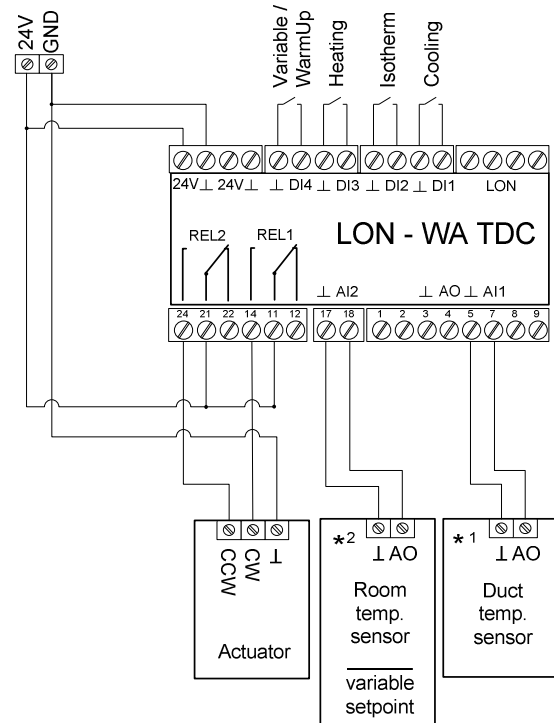
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4 Connection diagrams

**Wiring example for diffuser
with continuous operation actuator:**



**Wiring example for diffuser
with 3-point control actuator (24 V AC):**



*1 Alternatively via LON

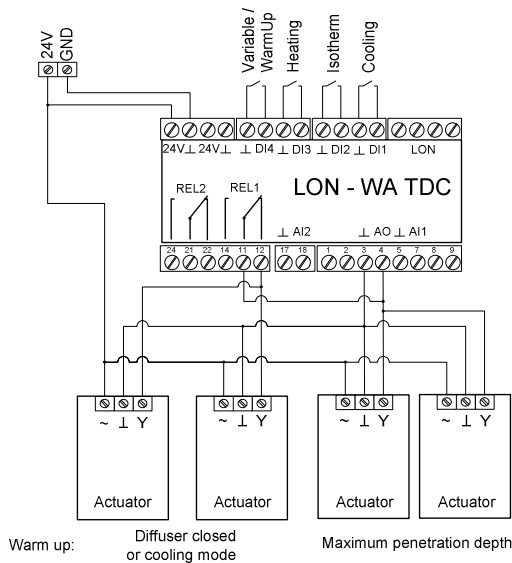
*2 Alternatively via LON or constant

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Wiring example for heating circuit:



Both diffusers with continuous actuators (0-10 V DC control) and 3-point actuators (24 V AC) can be controlled, providing the set points are configured accordingly.

Number of diffusers/actuators:

Max. 20 actuators 3-point control (...E2, E5)
power consumption per actuator max. 4 VA at 24V AC

Max. 10 continuous operation rotary activators
(DUK / VD / VDR / VDL-...-E3, DG-VAR)

Max. 5 continuous operation linear/spindle actuators
(DUK-...-E6, QSH/ISH-...-E3)

The duct and room temperature can either be specified via a LON signal or as an analogue voltage signal for the LON-WA TDC. With this, there is also the option of defining the room temperature as a constant.

The temperature-sensitive control function can be manually overridden by means of the override controls, WarmUp, Variable, Heating, Isothermal and Cooling.

Transmission of all signals and control of motorised adjustable diffusers through "Standard Network Variable Types" (SNVT) with LON fieldbus FTT 10A to higher ranking systems; transmission of the system status; integrated Watchdog and Heartbeat switching:

Technical data:

- Distribution voltage 24 V AC $\pm 15\%$, 50-60 Hz with double terminals for looping
- 2 analogue inputs 0 – 10 V DC
- 4 digital inputs
- 1 analogue output 0 – 10 V DC
- 2 digital outputs (alternating relay)
- 4 LON terminals
- FTT10 Transceiver
- Type of protection IP 65
- Terminals as screw terminals 90° for 0.08 mm² – 2.5 mm² with reverse polarity protected socket

5 Accessories

Active duct temperature sensor 0 – 10 V, 0 – 50 °C
Type: AKF 10 062 07 TRV

Active room temperature sensor 0 – 10 V, 0 – 50 °C
Type: WRF04 TRV (for surface mounting)

6 Specification text

LON-WA TDC

LON module for controlling adjustable discharge diffusers on the basis of the temperature difference between duct (supply air) temperature and room temperature.

Definition of a project-specific characteristic curve (discharged angle vs temperature difference) with two set points (DeltaT1 and DeltaT2) allows the space characteristics to be taken into account. These two set points can be individually adjusted: DeltaT1 is used to specify the temperature difference up to which the discharge angle is set for 100% cooling DeltaT2 is the point of isothermal operation ie the mid point discharge angle setting.

Manufacture: TROX
Type LON-WA TDC