

Control modules

Type LON-WA TDC



For the temperature-based control of adjustable air terminal devices, for heating or cooling mode

Ideal adjustment of the discharge angle to varying loads

- For adjustable air terminal devices
- Heating, cooling, isothermal operation
- Adjustment of the discharge direction based on the supply air to room air temperature
- Bespoke solutions, adjustment of the characteristic
- For up to 20 heating/cooling actuators (3-point)
- For up to 10 modulating rotary actuators or 5 modulating spindle actuators
- Override controls



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Application

Application

- Type LON-WA TDC control modules for the temperature-based control of adjustable air terminal devices, for heating or cooling mode
- For air terminal devices Types VD, VDL, VDR, QSH, ISH, TJN, DUK and DG-VAR
- Heating, cooling, isothermal operation
- Analogue output for modulating actuators
- Digital output for 3-point actuators
- LonWorks interface for the transmission of standard network variables
- A plug-in for all LNS-based network integration tools (LNS version 3.3 and higher) is available

for configuration

Special characteristics

- Bespoke solutions since the characteristic can be adjusted
- Temperature values are transmitted as voltage signals or network variables
- Control input for actuators with a modulating signal (0 – 10 V DC) or 3-point (24 V AC)
- Override control functions for heating up, variable operation, heating, cooling and isothermal operation

Description

Parts and characteristics

- Microprocessor system with programme and system data stored in nonvolatile memory
- Double-stack terminal block for supply voltage connection and communication cable
- Inputs and outputs with screw terminals

Construction features

- PCB with terminals enclosed in a casing
- Casing is to be screw-fixed to the installation surface

- Casing with knockouts for cables

Materials and surfaces

- Plastic casing

Maintenance

- Maintenance-free as construction and materials are not subject to wear

Functional description

Adjustable air terminal devices with actuators are used to achieve the best possible air distribution in high and large rooms with changing thermal loads. Type LON-WA TDC control modules control actuators based on the supply air to room air difference.

Supply air temperature and room air temperature are measured with external sensors and

Operating modes

Temperature difference control

- Calculation of the supply air to room air temperature difference
- Discharge angle corresponds to characteristic
- Standard operating mode if temperature difference control has been configured
- No override functions

Variable operation

- Direct control of the discharge angle with a voltage signal (AI1) or with a network variable (nviManCntrl)
- Temperature difference is neglected
- Standard operating mode if variable operation has been configured
- No override functions

Cooling

- Override function, the discharge angle is reduced to the minimum
- Minimum angle is defined with SCPTminRnge (nvoActuatorPos)
- Set via DI1 or nviDI1_State

Isothermal operation

- Override function, the discharge angle is neutral
- Neutral position is defined with SCPTdischargeAirHeatingSetpoint
- Set via DI2 or nviDI2_State

Heating

- Override function, the discharge angle is increased to the maximum
- The maximum angle is defined with SCPTmaxRnge (nvoActuatorPos) and SCPTdischargeAitCoolingSetpoint
- Set via DI3 or nviDI3_State

transmitted as voltage signals or LonWorks network variables Characteristic curve values translate into discharge angles, and the actuators are set accordingly.

Override functions are available to set various operating modes.

The program sequence of the control module includes a watchdog and a heartbeat function to monitor and maintain operation.

Heating up

- Override function, the discharge angle is reduced to the minimum
- Set via DI4 or nviDI4_State

Inputs

Two analogue inputs

- Analogue inputs with configurable characteristic for signalling the supply air temperature and the room air temperature
- With variable operation: Analogue input for signalling the setpoint discharge angle

Four digital inputs

- Digital inputs for volt-free switches
- Override functions for variable operation, cooling, heating and isothermal operation

Outputs

One analogue output

- Analogue output with configurable characteristic for signalling to modulating actuators

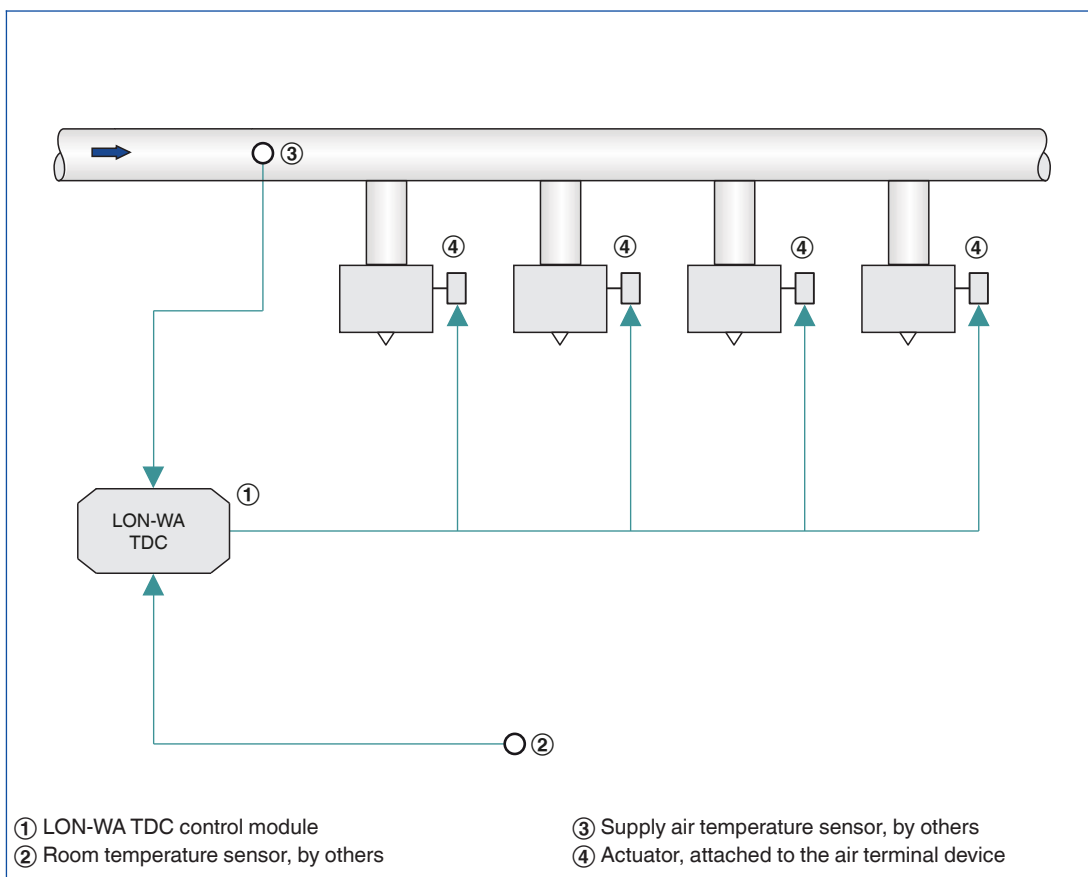
Two digital outputs

- Digital outputs for signalling to heating/cooling actuators, 2-wire control (3-point)

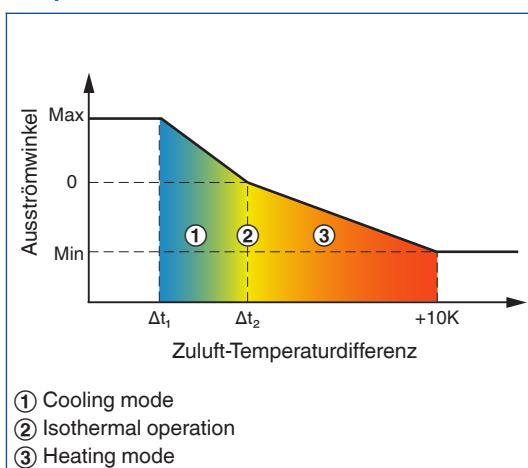
Interface to the central BMS

- Actual operating values and fault messages of the control module are transferred via the network
- Supply air temperature, room air temperature, discharge angle
- Status of the digital inputs and voltage at each analogue input

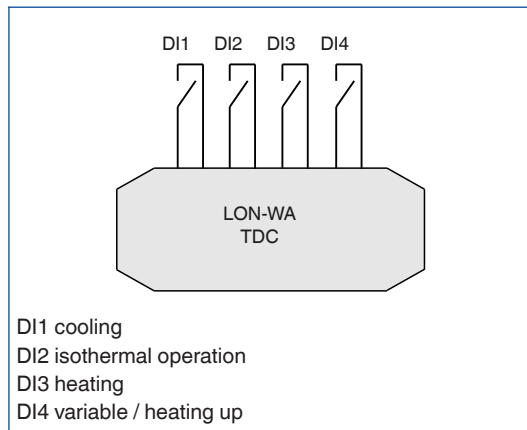
LON-WA TDC temperature difference control for adjustable air terminal devices with an actuator



Temperature difference control



LON-WA TDC digital inputs



Supply voltage	24 V AC \pm 15 %, 50/60 Hz
Power rating	3.5 VA
Communication interface	LonWorks transceiver FTT-10A (free topology, twisted pair)
Connection to LonWorks network	4 terminals for cables with a cross section between 0.08 and 2.5 mm ² , with reverse polarity protection
Operating temperature	0 – 50 °C
IEC protection class	III (protective extra-low voltage)
Protection level	IP 65
EC conformity	EMC to 2004/108/EU, low voltage to 2006/95/EU
Dimensions (B x H x T)	160 x 120 x 42 mm

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

Control modules for signalling the temperature-based control input signal to adjustable air terminal devices with an actuator. For the connection of external temperature sensors for supply air and room air. A project-specific characteristic with two operating points to define the discharge angle based on the supply air to room air temperature difference is stored in the control module and cannot be deleted.

Ready-to-operate unit which consists of a PCB and a casing with knockouts. Control module electronics using a microprocessor, with configuration settings stored in EEPROM memory and hence safe in case of a power failure. Two analogue inputs, four volt-free digital inputs, one analogue output and two digital outputs as relay contacts.

The control modules include a LonWorks transceiver FTT-10A (free topology, twisted pair) and a service pin for LonWorks integration.

For the connection of modulating actuators to the analogue output, or of heating/cooling actuators (3-point) to the digital output.

Special characteristics

- Bespoke solutions since the characteristic can

be adjusted

- Temperature values are transmitted as voltage signals or network variables
- Control input for actuators with a modulating signal (0 – 10 V DC) or 3-point (24 V AC)
- Override control functions for heating up, variable operation, heating, cooling and isothermal operation

Materials and surfaces

- Plastic casing

Technical data

- Supply voltage: 24 V AC $\pm 15\%$, 50/60 Hz
- Power rating: 3.5 VA
- Communication interface: LonWorks transceiver FTT-10A (free topology, twisted pair)
- Connection of LonWorks network: 4 terminals for cables with a cross section between 0.08 and 2.5 mm², with reverse polarity protection
- IEC protection class: III (protective extra-low voltage)
- Protection level: IP 65

LON-WA TDC



1 Type

LON-WA TDC Module for the control of supply air
based on the supply air to room air
difference

Description of network variables (SNVT)

All variables and parameters are based on standard network variables (SNVT); this ensures integration of LON-WA TDC with a LonWorks network.

Operating mode default setting

- Input variables nviDI1_State, nviDI2_State, nviDI3_State, nviDI4_State for operating modes
- nviDI1_State has the highest LON priority
- nviDI4_State has the lowest LON priority
- The valid binding of an input variable results in a valid operating mode default setting
- The invalid binding of an input variable does not result in an operating mode default setting in LON

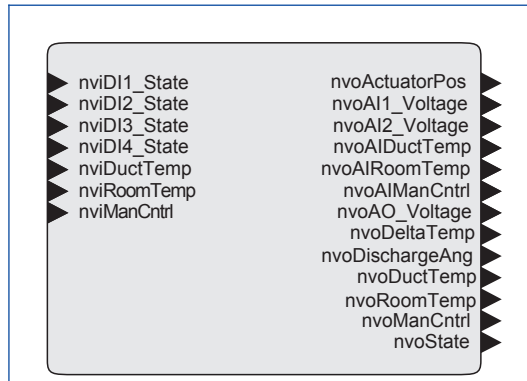
Data points

Name of variable	Data type	Meaning
nviDI1_State	SNVT_switch	Operating mode default setting – cooling
nviDI2_State	SNVT_switch	Operating mode default setting – isothermal operation
nviDI3_State	SNVT_switch	Operating mode default setting – heating
nviDI4_State	SNVT_switch	Operating mode default setting – variable operation or heating up
nviDuctTemp	SNVT_temp_p	Supply air temperature actual value as LON data point
nviRoomTemp	SNVT_temp_p	Room temperature actual value as LON data point
nviManCntrl	SNVT_lev_percent	Discharge angle default setting
nvoActuatorPos	SNVT_lev_percent	Setpoint position of the actuator
nvoAI1_Voltage	SNVT_volt	Voltage at analogue input AI1 (supply air temperature)
nvoAI2_Voltage	SNVT_volt	Voltage at analogue input AI2 (room temperature or default for variable operation)
nvoAIDuctTemp	SNVT_temp_p	Supply air temperature actual value from AI1
nvoAIRoomTemp	SNVT_temp_p	Room temperature actual value from AI2
nvoAIManCntrl	SNVT_lev_percent	Setpoint position of the actuator during variable operation, at AI2
nvoAO_Voltage	SNVT_volt	Actual voltage at the analogue output
nvoDeltaTemp	SNVT_temp_p	Actual temperature difference
nvoDischargeAng	SNVT_angle_deg	Actual discharge angle
nvoDuctTemp	SNVT_temp_p	Supply air temperature actual value
nvoRoomTemp	SNVT_temp_p	Room temperature actual value
nvoManCntrl	SNVT_lev_percent	Setpoint discharge angle during variable operation, default from AI2 or nviManCntrl
nvoState	SNVT_state	Status information

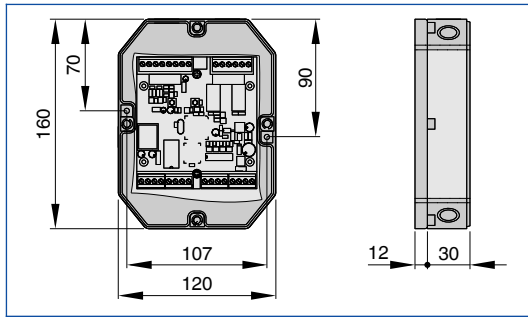
Configuration parameters

Parameter	Data type	Meaning
SCPTdeviceGroupID	SCPT_deviceGroupID	Air terminal device and actuator
SCPTdirection	SCPT_direction	Assignment of inputs and outputs
SCPTdischargeAirCoolingSetpoint	SCPT_dischargeAirCoolingSetpoint	Supply air to room air temperature difference for maximum cooling
SCPTdischargeAirHeatingSetpoint	SCPT_dischargeAirHeatingSetpoint	Supply air to room air temperature difference with isothermal operation
SCPTHoldTime	SCPT_maxSendTime	Duration of heating up
SCPTpwrUpDelay	SCPT_pwrUpDelay	Actuator synchronisation intervals (3-point)
SCPTsceneNmbr	SCPT_sceneNmbr	Software version
SCPToffsetTemp (nviRoomTemp)	SCPT_offsetTemp	Room temperature default at constant room temperature
SCPTmaxRnge (nvoActuatorPos)	SCPT_maxRnge	Maximum discharge angle
SCPTmaxSendTime (nvoActuatorPos)	SCPT_maxSendTime	Interval for sending nvoActuatorPos
SCPTminRnge (nvoActuatorPos)	SCPT_minRnge	Minimum discharge angle
SCPTsndDelta (nvoActuatorPos)	SCPT_sndDelta	Value difference for sending nvoActuatorPos
SCPTmaxRnge (nvoAI1_Voltage)	SCPT_maxRnge	Maximum voltage at AI1
SCPTminRnge (nvoAI1_Voltage)	SCPT_minRnge	Minimum voltage at AI1
SCPTmaxRnge (nvoAI2_Voltage)	SCPT_maxRnge	Maximum voltage at AI2
SCPTminRnge (nvoAI2_Voltage)	SCPT_minRnge	Minimum voltage at AI2
SCPTmaxRnge (nvoAIDuctTemp)	SCPT_maxRnge	Maximum supply air temperature
SCPTminRnge (nvoAIDuctTemp)	SCPT_minRnge	Minimum supply air temperature
SCPTmaxRnge (nvoAIRoomTemp)	SCPT_maxRnge	Maximum room temperature
SCPTminRnge (nvoAIRoomTemp)	SCPT_minRnge	Minimum room temperature
SCPTmaxRnge (nvoAO_Voltage)	SCPT_maxRnge	Maximum voltage at AO1
SCPTminRnge (nvoAO_Voltage)	SCPT_minRnge	Minimum voltage at AO1
SCPTmaxSendTime (nvoDeltaTemp)	SCPT_maxSendTime	Interval for sending nvoDeltaTemp
SCPTsndDelta (nvoDeltaTemp)	SCPT_sndDelta	Value difference for sending nvoDeltaTemp
SCPTmaxRnge (nvoDischargeAng)	SCPT_maxRnge	Maximum discharge angle
SCPTmaxSendTime (nvoDischargeAng)	SCPT_maxSendTime	Interval for sending nvoDischargeAng
SCPTminRnge (nvoDischargeAng)	SCPT_minRnge	Minimum discharge angle
SCPTsndDelta (nvoDischargeAng)	SCPT_sndDelta	Value difference for sending nvoDischargeAng
SCPTmaxSendTime (nvoDuctTemp)	SCPT_maxSendTime	Interval for sending nvoDuctTemp
SCPTsndDelta (nvoDuctTemp)	SCPT_sndDelta	Value difference for sending nvoDuctTemp
SCPTmaxSendTime (nvoRoomTemp)	SCPT_maxSendTime	Interval for sending nvoRoomTemp
SCPTsndDelta (nvoRoomTemp)	SCPT_sndDelta	Value difference for sending nvoRoomTemp
SCPTmaxSendTime (nvoManCntrl)	SCPT_maxSendTime	Interval for sending nvoManCntrl
SCPTsndDelta (nvoManCntrl)	SCPT_sndDelta	Value difference for sending nvoManCntrl

Virtual function block



LON-WA TDC



Installation and commissioning

- Fix the casing with two screws
- A trained LonWorks systems integrator must carry out the integration into the overall system
- Temperature sensors, e.g. active duct temperature sensor and active room temperature sensor, 0 – 10 V DC each, which corresponds to 0 – 50 °C; to be provided by others