

Product Description

The fancoil room controller has been designed for individual control of temperature in commercial, industrial and residential buildings. It is tailored for two-pipe fan coil with two-wire electric valves. With its flush mounted modern design the device combines digital technology with a large LCD display and additional buttons, which enables the single room controller to be used intuitively.



NXGT LCF02 5DO-485

FANCOIL CONTROLLER

Mounting advise room sensor

The Accuracy of the room sensors are influenced by the technical specifications as well as the positioning and the installation type.

During Assembly:

- Seal mounting box (if present).
- Installation type, air draught, heat source, radiation heat or direct sunlight can affect the measurement.
- Building material specific properties of the installation place (brick-, concrete-, partition wall, cavity wall, ...) can affect the measurement. (e.g.: Concrete accepts room temperature variation slower than cavity walls)

Assembly not recommended in...

- Air draught (e.g.: close to windows / doors / fans ...)
- · Near heating sources,
- Direct sunlight
- Niches / between furniture / ...

Security Advice - Caution

The installation and assembly of electrical equipment should only be performed by authorized personnel.

The product should only be used for the intended application. Unauthorized modifications are prohibited! The product must not be used in relation with any equipment that in case of a failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals or assets. Ensure all power is disconnected before installing. Do not connect to live/operating equipment.

CAUTION! Risk of electric shock due to live components within the enclosure, especially devices with mains voltage supply (usually between 90..265 V).

Please comply with

- Local laws, health & safety regulations, technical standards and regulations
- Condition of the device at the time of installation, to ensure safe installation
- · This data sheet and installation manual

For further information

Technical Data

Measuring values	temperature			
Output switch contact	(for heating/cooling 2-point control or PWM)		terminal 5 6 7 – LO ME HI (for Fan) 3x normally open contact, max. 250 V ~ / 3 A max. 30 V = / 3 A	
Network technology	RS485 Modbus, RTU, half-duplex, b odd (1 stopbit)	oaud rate 4.800, 9.6	600, 19.200 or 38.4	100, parity: non (2 stopbits), even or
Power supply	24 V = (±10%) 24 V ~ (±20%) SEL	V		
Power consumption	3 W (24 V =)			
Measuring range temp.	+1+50 °C	+1+50 °C		
Accuracy temperature	±1 K (typ. at 21 °C)			
Inputs	terminal 10 input for external sensor NTC10K	terminal 11 – ESI DP input digital for floating contact, window contact, dew point sensor		terminal 12 - OCC input digital for floating contact, occupancy sensor, key card switch
Control functions	set point adjustment +1+50 °C, (de	fault +16+30 °C)		
Display	LCD 64x41 mm, white background I	ighting		
Enclosure	ABS, pure white			
Protection	IP20 according to EN 60529			
Cable entry	rear entry			
Connection electrical	terminal block max. 1,5 mm ²			
Ambient condition	-10+50 °C, max. 95% rH non-cond	ensing		
Weight	160 g			
Mounting	flush mounted with standard EU box	: (Ø=60 mm)		

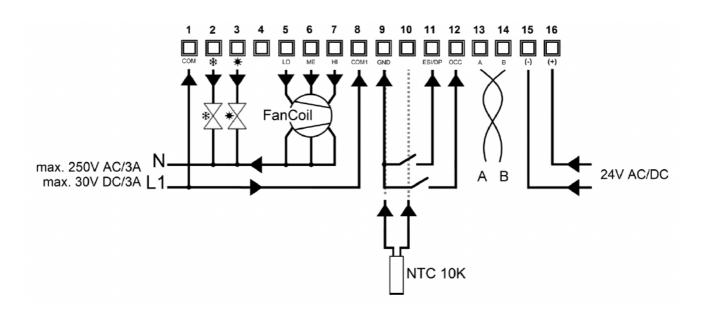
Product Testing & Certification

CE RR

VXGT LCF02 5D0-48

For further information

Connection Plan



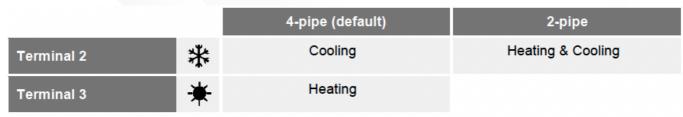
Power supply

When several BUS devices are supplied by one 24 V AC voltage supply, it is to be ensured that all "positive" operating voltage input terminals (+) of the field devices are connected with each other and all "negative" operating voltage input terminals (-) (=reference potential) are connected together (in-phase connection of field devices).

In case of reversed polarity at one field device, a supply voltage short-circuit would be caused by that device. The consequential short-circuit current flowing through this field my cause damage to it.

Therefore, pay attention to correct wiring.

Controller output signal

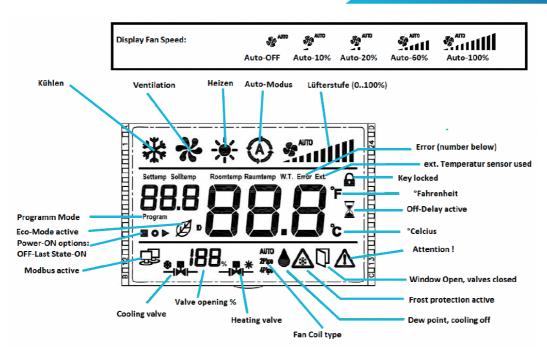


For further information

DATA SHEET

NXGT LCF02 5DO-485 FANCOIL CONTROLLER

Display Panel



Function Description

Communication factory default

Modbus-adress:	1		
Communication-interface:	RS485	Communication-protocol:	Modbus-RTU
Baud Rate:	9600	Parity:	No parity
Data:	8 bit	Stop:	2 bit

DEVICE INFORMATION		The device information (version and type number) are displayed on the start screen for a short time.
COMMUNICATION	ц.	symbol flashes (If the device does not communicate via the bus, the symbol will be disappear after 10 seconds)
PARAMETER MENU	(3)	To enter the parameter menu (i.e. for Modbus-communication settings): - Press and hold "mode"-button for 5 seconds. - Enter password: (default: 987) • Digit selection: mode-button • Arrow keys (▲/▼): increase / decrease value
		- Select parameter with arrow keys

AFTER PARAMETER SELECTION / SETTING, DON'T PRESS ANY BUTTON FOR 3 SECONDS TO SAVE THE SETTINGS.

For further information

No.	Parameter	Description	default
1	Modbus Adress	ID.1- ID.247	1
2	Baud rate	1 = 4800bps 2 = 9600 3 = 19200 4 = 38400	2
3	Parity	0 = none 1 = even 2 = odd	0
4	Stop Bits	1 = 1 Stopbit 2 = 2 Stopbits	2
5	Temperature Offset internal sensor	-5,0 K+5,0 K	0
6	Temperatur Offset external sensor	-5,0 K+5,0 K	0
7	Piping system	0 = 2-pipe 1 = 4-pipe	1
8	Factory reset	 Set parameter to 1 Press mode key Device is factory reset. (Device stays in Parameter menu for Modbus configuration) 	0

Heating/ cooling with 2-point-/ 3-point-controller (Register address 0x0130)

In the case of temperature control, the 2-point controller only knows the switching states heating ON and heating OFF. The 3-point controller also knows the switching state of cooling. Two - and three-point controller work with a hysteresis.

Heating/ cooling with PI-controller (PWM) (Register address 0x0130)

The time response of the PI control loop depends on the control parameters xp for the proportional area and tn for the reset time of the integral range. In case of an error, the P portion immediately changes the position value proportionally to the error variable, while the integral portion takes effect after a certain time. The resulting actuating variable is output as a pulse-width-modulated signal directly to the outputs.



Press the "Mode Key" , to adjust the mode cyclically (Cooling > Ventilating > Auto mode > Heating ...). In 2-pipe configuration not available modes (depending on the change-over sensor's signal) will be skipped. In this case the user can select the available modes only.

Standby / ECO / ON

The Power-Button switches the device from Stand-by to ON. In Standby the display is off, but the control loop is actively monitoring the temperature and will activate the heating output if the room temperature drops below the frost protection threshold.

Pressing the button once switches the display on and the device to ECO mode. In ECO mode it controls the room temperature to the setpoint predefined by register 275 and 276 (0x0113, 0x0114). The display will show the average of both ECO Setpoint Temperatures (25+18 /2=21,5) and the leaf symbol to indicate the ECO mode. In ECO mode the setpoint is fixed and the device does not react to any button pressed by the user besides pressing the Stand-by /ECO/ON button a 2nd time. Then it will switch from ECO to comfort mode. To indicate that the Fancoil thermostat is in ECO mode it will show the leaf and the word ECO in the display.

For further information

In case an occupancy sensor is connected to one of the inputs the mode will change from ECO to comfort as soon as the input becomes active and the previously used Setpoint will be restored and the leaf symbol will not be showing any more.

Temperature sensor input - temperature limiter and external sensor

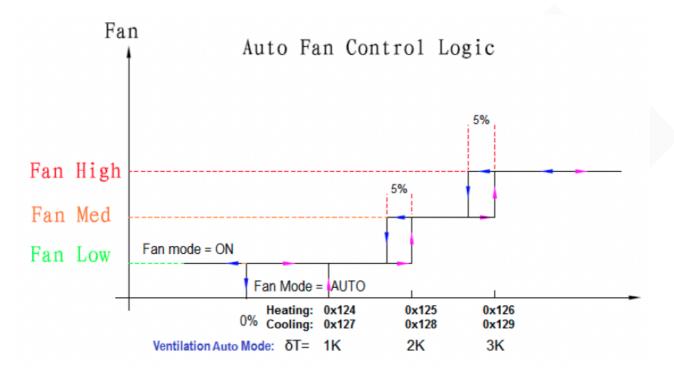
The temperature sensor input (address 0x0152) can be used as change over sensor (addresses 0x012B and 0x012C) or as external temperature sensor.

Furthermore, it can also be used to limit the heating temperature (address 0x010A) and cooling temperature (address 0x010B). This is the case for floor heating systems, where the external sensor is embedded in the floor. In case the floor temperature will exceed a certain threshold the heating valve shall be closed to avoid damaging the floor or the pipes embedded in the floor.

Fan control

If the fan is configured to be 1-stage or 2-stage the selection will be adapted accordingly. In "ventilating mode", the valves will be closed. If the fan speed is set to Auto the steps are switched depending on the temperature difference between the setpoint value and the current temperature value.

In auto mode heating or cooling, the fan level is calculated from the output of the PI loop (control variable).



For further information

°F/°C selective

Temp display range is 32 °F..99 °F, respectively 0 °C..50 °C (factory default is °C). By simultaneously pressing the keys "A" and "▼" the display of the unit system can be switched directly on the LCD.

Temperature offset correction (Register address 0x0106)

The internal sensor will be affected by the Thermostat's self-heating. As a consequence it would display a higher room temperature than the average of indoor temperature (real value). Item 5 & 6 of the parameter table does contain the correction of temperature offset (resolution 0,1 °C).

Set the Temperature set point range (Register address 0x0110 - 0x0112)

Press "▲"or "▼" key to adjust the temperature set point range. Factory default (°C) is 16 °C..30 °C.

Key lock selection (Register address 0x010D)

If a key is pressed that is locked, the lock symbol will appear for 2s and blink 2x but no further action is taken. Power failure - Restart selection (Register address 0x010C)

Symbol Description



Keep thermostat switched OFF

Switch thermostat to last state before power failure (Record and Memorize)

Turn the thermostat ON

Storage during power loss

The status will be kept in EEPROM, while the power failure, so no data will be lost. The setpoint is not saved. The standard setpoint after power-on reset applies, register address 271 (0x010F).

Occupancy (OCC)

If the input is configured for an Occupancy sensor. If the sensor indicates "UnOccupied" the current setpoint will be replaced by the Eco Mode Setpoint Temp. The display will show the leaf symbol and the lettering ECO to indicate the ECO mode. Once the room occupancy is detected again the previously used Setpoint will be restored and the leaf symbol will not be showing any more.

Window contact (ESI)

If the input is configured as window contact, the "Window open" Symbol will be displayed the thermostat will check every 3 seconds the input whether active. The cooling valve will be closed as long as the input will be active. The rest of the thermostat will work as usual, the user may change the setpoint or the fan stage, but the valve outputs will remain in valve closed position. If configured the "Window open" 🗋 or the Dew Point 💧 symbol will be flashing. When the input will not be active, the thermostat's outputs return to normal operation and operates the outputs normally.

Sensor failure alarm

In case the room NTC temp sensor is open or short, thermostat switches fan to medium and the valve to 50% (5V output, 50% duty cycle for PWM and ON/OFF). The display will show (blinking) error code: "E1" Thermostat will allow to control fan manually as well as the valve output using the "A" or "V" keys. Every operation of the "A" or "V" keys will decrement / increment the output voltage by 1V = 10% AND the PWM by 10%. The percentage is shown in the display.

For further information

Input F	Register			
Adres	s	Access	Description	Register value ≙ Value range
0	0x000	R	Thermokon model identification	0x FF00 ≙ LCF-5DO
1		R	Firmware-Version	e.g. 0x1110 ≙ 1.1.1
2	0x0002	R	Back-Box Type	05 ≙ DOD5R
3	0x0003	R	Value oft he integrated temperature sensor °C / °F	0500 ≙ 050,0°C 3001200 ≙ +30,0+120,0°F
4		R	Fan-State 0b0000000 = OFF 0b0000001 = Fan stage low 0b0000010 = Fan stage medium 0b0000100 = Fan stage high 0b00001000 = Auto OFF 0b00001001 = Auto low 0b00001010 = Auto medium 0b00001100 = Auto high	
5		R	VA1 State – output valve 1 cooling (PWM cycle time ON)	01000 ≙ 0100%
6		R	VA2 State – output valve 2 heating (PWM cycle time ON)	01000 ≙ 0100%
7			Reserved	
8		R	External temperature sensor °C / °F	200+1000 ≙ -20,0+100,0°C 02100 ≙ 0,0+210,0°F
9		R	Failure status 0x00= no failure 0x01= control loop temperature sensor alarm 0x02= external temperature sensor high limit alarm – (cablebreak) 0x04= external temperature sensor low limit alarm – (short circuit) 0x08= change over sensor missing alarm	
10	0x000A	R	External input 1 – terminal 11 0 = Contact open, 1= Contact closed (i.e. window contact, dew point sensor)	01
11	0x000B	R	External input 2 – terminal 12 0 = Contact open, 1= Contact closed (i.e. OCC Sensor, keycard-switch)	01

For further information

Hold	Holding Register					
Adr	ess		Access	Description Re	egister value ≙ Value range	Defau
2	256	0x0100	R/W	Customer set Device location identification	065535	0
2	257	0x0101	R/W	LCD temperature Unit 0 =°C 1=°F (converted values)	01	0
2	258	0x0102	R/W	Beeper Intensity 0=Off 15 (Volume)	05	5
2	259	0x0103	R/W	Backlight intensity (operation)	0100 ≙ 0100%	80
2	260	0x0104	R/W	Reserved		
2	261	0x0105	R/W	Backlight operating delay setting	1255 ≙ 1255 Sec. (on)	15
2	262	0x0106	R/W	Internal Sensor Temperature Offset (added to meaured value)	-5050 ≙ -5,0+5,0 [°C] -250250 ≙ -25,0+25,0 [°F]	0
2	263	0x0107	R/W	external Sensor Temperature Offset (added to meaured value)	-5050 ≙ -5,0+5,0 [°C] -250250 ≙ -25,0+25,0 [°F]	0
2	264	0x0108	R/W	Display language 0= german 1= english	01	0
2	265	0x0109	R/W	Individual passwords setting 001-999 default=987 000 = no password	000999	987
2	266	0x010A	R/W	External temperature (limiter) sensor high limit (338=3, for limiter)	-2001000 ≙ -20,0+100,0 [°C] 02100 ≙ 0,0+210,0 [°F]	400 / 110
2	267	0x010B	R/W	External temperature (limiter) sensor low limit (338=3, for limiter)	-2001000 ≙ -20,0+100,0 [°C] 02100 ≙ 0,0+210,0 [°F]	0 / 320
2	268	0x010C	R/W	Power failure 0= keep off after power-on-reset 1= return to last state after power failure 2= switch on after power-on-reset	02	1
2	269	0x010D	R/W	Key-lock Once a locked key is pressed the LOCK symbol shall to 0x00=unlocked 0x01=lock on/off 0x02=lock mode 0x08=lock fan speed 0x10=lock temp settings + / - 0x1F=lock all keystrokes	be displayed and blink twice.	0
2	270	0x010E	R/W	isplay settings b00000001= show setpoint (if no setpoint is shown, keys are locked) b00000010= show room temperature b00000100 = show valve symbol b000001000 = show PI-loop percentage (if only room temperature or setpoint is shown, then in big numbers)		

General settings

For further information

	Holdir	lolding Register					
	Adres	ss	Access	Description Re	gister value ≙ value range	default	
	271	0x010F	R/W	Default Setpoint after Power On Reset	0500 ≙ 0,0+50,0 [°C] 3001200 ≙ +30,0+120,0 [°F]	210 / 700	
<u>s</u>	272	0x0110	R/W	Setpoint temperature lower limit	0500 ≙ 0,0+50,0 [°C] 3001200 ≙ +30,0+120,0 [°F]	160 / 600	
settings	273	0x0111	R/W	Setpoint temperature upper limit	0500 ≙ 0,0+50,0 [°C] 3001200 ≙ +30,0+120,0 [°F]	300 / 860	
	274	0x0112	R/W	Setpoint increment/decrement value	1100 ≙ 0,110,0 [°C] 1500 ≙ 0,150,0 [°F]	5 / 10	
Set-point	275	0x0113	R/W	ECO mode temperature setpoint cooling	250450 ≙ +25,045,0 [°C] 7501100 ≙ +75,0110,0 [°F]	300 / 860	
Se	276	0x0114	R/W	ECO mode temperature setpoint heating	120240 ≙ +12,024,0 [°C] 50750 ≙ +5,075,0 [°F]	190 / 660	

For further information

Holdi	ng Registe	r			
Adre	ss	Access	Description	Register value ≙ Value range	default.
277	0x0115	R	Controller mode Comfort: 0b0000 0000= Controller off (frost protection active, <i>LCD off</i>) 0b0000 0001= Controller auto mode (<i>heating & cooling</i>) 0b0000 0010= Controller heating mode only 0b0000 0010= Controller cooling mode only 0b0000 0100= ventilating (<i>PI-loop controls fan stages only, v</i> Regler-Modus ECO : 0b0001 0000= Controller off (<i>Frost protection active</i>) 0b0001 0001= Controller auto mode (<i>heating&cooling</i>) 0b0001 0010= Controller heating mode only 0b0001 0011= Controller cooling mode only 0b0001 0010= ventilating (<i>PI-loop controls fan stages only, v</i>	alves closed)	1
278	0x0116	R/W	Fancoil Typ: 2- or 4-pipe 0b0000000=2-pipe: cooling + heating with change over 0b00000001=4-pipe: cooling + heating / (or if 6WV used)		1
279	0x0117	R/W	Fan stages and operation modes 0b00000000 = none (fan key is locked, the fan symbol will be 0bxxxx0001 = 1 fan stage 0bxxxx0010 = 2 fan stages 0bxxxx0011 = 3 fan stages 0b0001xxxx = During heating mode fan is disabled 0b0010xxxx = During cooling/ventilation mode fan is disabled 0b0011xxxx = during heating/ cooling mode fan is disabled		3
280	0x0118	R/W	Start fan at highest stage for (_) seconds	060 ≙ 060 Sek.	0
281	0x0119	R/W	Fan OFF-Delay 0= fan never stops 1255 ≙ 1255 Min after valve closing fan stops for minute	S.	15
282	0x011A	R/W	PWM 0 = for 2 point control 1255 ≙ 1255 minutes PWM cycle time		15
283	0x011B	R/W	Deadband	1100 ≙ 0,110,0 [°C]	10
284	0x011C	R/W	Heating Proportional Band Xp_heat	1100 ≙ 0,110,0 [°C]	20
285	0x011D	R/W	Heating Integration Time Tn_heat	0255 ≙ 0255 Minuten	30
286	0x011E	R/W	Cooling Proportional Band Xp_cool	1100 ≙ 0,110,0 [°C]	20
287	0x011F	R/W	Cooling Integration Time Tn_cool	0255 ≙ 0255 Minuten	30
288	0x0120	R/W	Minimal limit of the control variable heat	0100 ≙ 0100 %	0
289	0x0121	R/W	Maximal limit of the control variable heat	0100 ≙ 0100 %	100
290	0x0122	R/W	Minimal limit of the control variable cool	0100 ≙ 0100 %	0
291	0x0123	R/W	Maximal limit of the control variable cool	0100 ≙ 0100 %	100
292	0x0124	R/W	Fan stage 1 ON threshold control variable heat	0100 ≙ 0100 %	5
293	0x0125	R/W	Fan stage 2 ON threshold control variable heat	0100 ≙ 0100 %	35
294	0x0126	R/W	Fan stage 3 ON threshold control variable heat	0100 ≙ 0100 %	70
295	0x0127	R/W	Fan stage 1 ON threshold control variable cool	0100 ≙ 0100 %	5
296	0x0128	R/W	Fan stage 2 ON threshold control variable cool	0100 ≙ 0100 %	35
297	0x0129	R/W	Fan stage 3 ON threshold control variable cool	0100 ≙ 0100 %	70
298	0x012A	R/W	Frost protection temperature threshold	50150 ≙ +5,0+15,0 °C 400600 ≙ +40,0+60,0 °F	70/ 450
299	0x012B	R/W	Change-Over Temperature Threshold for Heating	0500 ≙ 0+50,0 °C 3001200 ≙ +30,0+120,0 °F	300/ 860
300	0x012C	R/W	Change-Over Temperature Threshold for Cooling (In case temperature is in between both thresholds the last state will be maintained)	0500 ≙ 0+50,0 °C 3001200 ≙ +30,0+120,0 °F	190/ 660
301			Reserved		

For further information

302		Reserved		
303		Reserved		
304 0x0130	R/W	Valve type selection, he 0= ON-OFF 1=PI Controller PWM 2= OFF-ON 3= inverted PWM	eating + cooling ON ≙ Valve Open, OFF ≙ Valve Closed 0100 ≙ 0-100 %PWM OFF ≙ Valve Open, ON ≙ Valve Closed 0 ≙ 100% PWM 100% ≙ 0% PWM	0

	Holding Register					
	Adress	Access	Description		default	
	336 0x0150	R/W	0 = no function 1 = Occupancy sensor (Open = Occupied) 2 = Occupancy sensor (Closed =Occupied) 3 = Window contact (Open = Window Open) 4 = Window contact (Closed = Window Open) 5 = Disable heating (Open = Heating disabled) 6 = Disable heating (Closed = Heating disabled) 7 = Disable cooling (Open = Disable Cooling) 8 = Disable cooling (Closed = Disable Cooling) 9 = Dew Point Sensor (Open = Dewpoint crossed, disable cooling) 10 = Dew Point Sensor (Closed = Dewpoint crossed, disable cooling)			
Inputs	337 0x0151	R/W	Configuration external input 2 0 = No function 1 = Occupancy sensor (Open = Occupied) 2= Occupancy sensor (Closed = Occupied) 3 = Window contact (Open = Window Open) 4 = Window contact (Closed = Window Open) 5 = Disable heating (Open = Heating disabled) 6 = Disable heating (Closed = Heating Disabled) 7 = Disable cooling (Open = Disable Cooling) 8 = Disable cooling (Closed = Disable Cooling) 9 = Dew Point Sensor (Open = Dewpoint crossed, disable cool 10 = Dew Point Sensor (Closed = Dewpoint crossed, disable cool		0	
	338 0x0152	R/W	Configuration Sensor Input 0 = none connected 1 = Change-Over Temp sensor (NTC10K) 2 = Ext. temp sensor (NTC10K) 3 = Temperature limiter			
	339 0x0153		ESI (Energy Savings Input) – ON delay ON delay for ESI. Delays Energy stop by n seconds.	[s]	0	
	340 0x0154	R/W	Occupation (OCC-input) – OFF- delay	065535 ≙ 065535 [s]	1800	
	Holding Regist	er (operatio	on to override FC from modbus)			

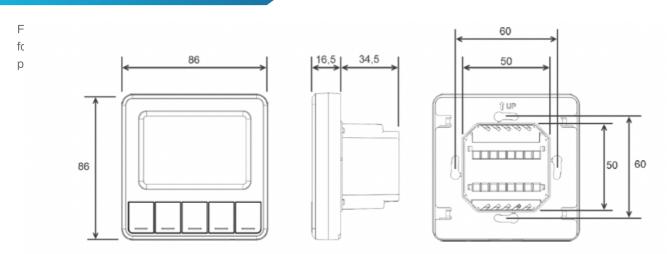
	Adres		Access	description R		
	512	0x0200	R/W	Active fan speed setting 0b0000000 = OFF 0b0000001 = Stage low 0b0000010 = Stage medium 0b0000100 = Stage high 0b00001000 = Auto OFF 0b00001001 = Auto Iow 0b00001010 = Auto medium 0b00001100 = Auto high		0
	513	0x0201	R/W	setpoint temperature	0500 ≙ 0+50,0 [°C] 3001200 ≙ +30+120,0 [°F]	0
Special	514	0x0202	R/W	Controller mode Comfort: 0b0000 0000= controller off (Frost protection active) 0b0000 0001= controller auto mode (heating + cooling) 0b0000 0010= controller heating mode only 0b0000 011= controller cooling mode only 0b0000 0100=ventilating only (PI loop controls fan stages only, va Controller mode ECO: 0b0001 0000=Regler aus (Frostschutz aktiv) 0b0001 0001=Regler Automatik-Modus (Heizen&Kühlen)	lves closed))	0

XGT LCF02 5D0-48

For further information

			0b0001 0010=Regler NUR Heizen 0b0001 0011=Regler NUR Kühlen 0b0001 0100=NUR Belüftung (PI-Regler steuert die Lüfterstufen, Ventile sind geschlossen)	
515	0x0203	R/W	Active symbols 0x00= show none	0
			0x01= show ECO-leaf	
			0x02= show dew point	
			0x04= show frost protect 0x08= show window open	
			0x10= show attention symbol	
			0x20= show hourglas	
			0x40= show lock -symbol	
			0x80= show ECO-writing	

Mounting Advice/ Dimensions



For further information