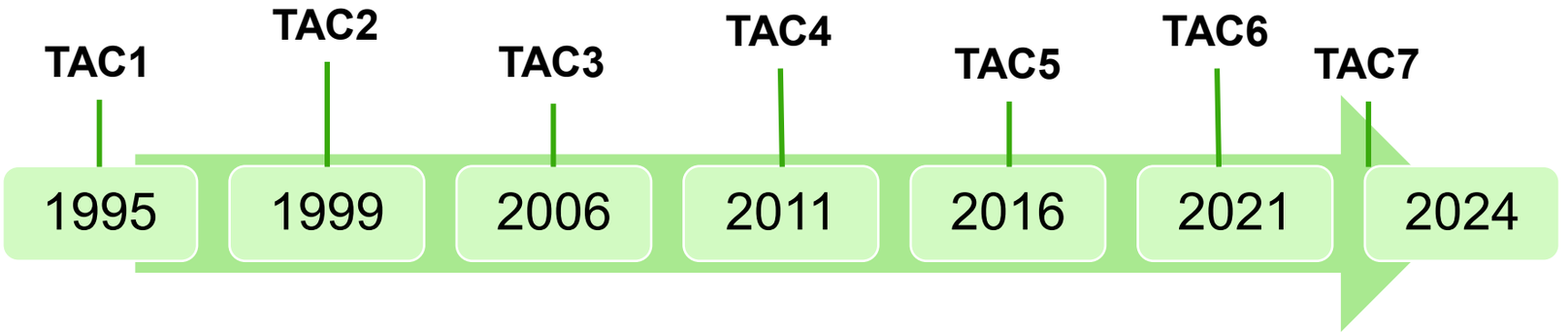
Introduction

TAC means **T**otal **A**irflow **C**ontrol, 7 is the generation number

TAC7 regulation system handles the control of the highly efficient ventilation units with or without heat recovery.

TAC7

Introduction



1995 - TAC1 Control of EC fan

1999 – TAC2 Control of Heat recovery - VAV control - link to sensor signal

2006 – TAC3 Remote control - Heating coils control

2011 – TAC4 Control of Heat recovery RX - MODBUS RTU - KNX - Touch screen control panel

2016 – TAC5 WIFI - ETHERNET

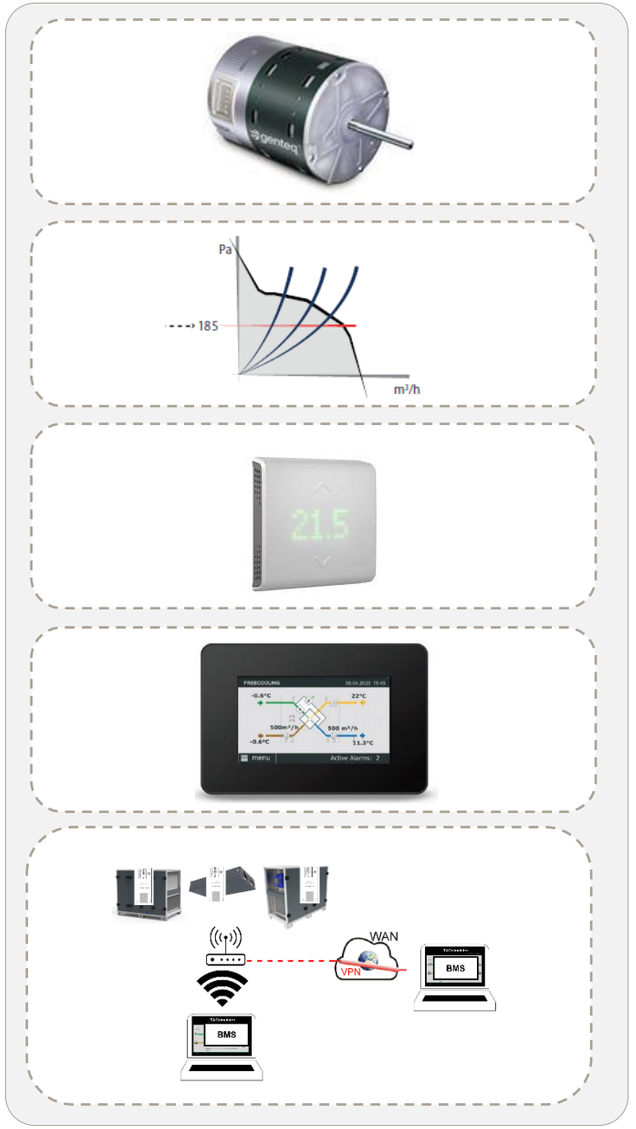
2021 – TAC6 Direct control of heating/cooling coils – supports all model – I^2C and Modbus Fieldbus for pressure sensors, HMI

2024 – TAC7 MQTT – heat pump – larger range of air quality sensors – cold climate preheater – HMI Swegon harmonized – IO mapping – cascade of reheater

TAC7

Introduction

- 1993 : launch of TAC (‘Total Airflow Control’) technology based on the in-house development of complex mathematical airflow algorithms and focused on control of airflow and/or air pressure
- Today, TAC7 - 7th generation - evolved into a system controlling the complete ventilation unit and all its components
- TAC key elements:
  - **Energy-efficient motors:**
    - electronically commutated DC motors
    - Communicate accurate instant information on the motor’s working point
  - **Airflow Control system:**
    - Constant airflow
    - Stepless airflow linked to analogue signal or sensors outputs
    - Constant pressure
    - Constant torque
  - **Comfort temperature Control System:**
    - Handling of preheating and recooling coil: electrical, waterborne, heat pump (only external)
    - Handling of external cooling coils: waterborne, chiller
    - Freecooling thanks to bypass of the heat exchanger modulation
  - **User-friendly interfaces:**
    - Configuration and visualization of parameters
    - Graphical touch screen
  - **Advanced communication and network integration solutions:**
    - Possibility to network units



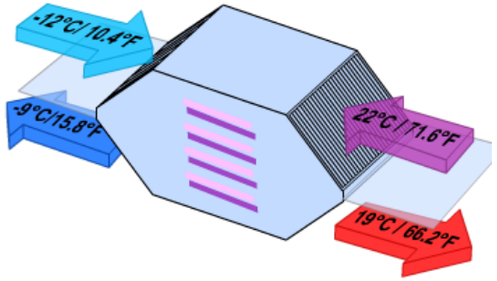
TAC7

Introduction

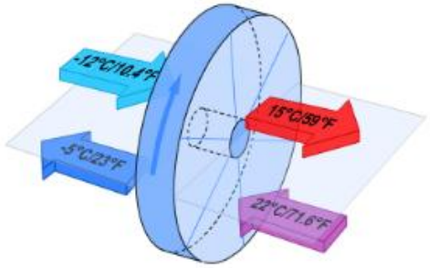
- **Principle of heat recovery unit**

The heat of the outgoing air is exchanged with the Incoming outdoor air by crossing the two flows through a heat exchanger inside the unit.

- **With counter flow plate heat exchanger: GLOBAL PX, GLOBAL PX TOP, ESENSA PX TOP**



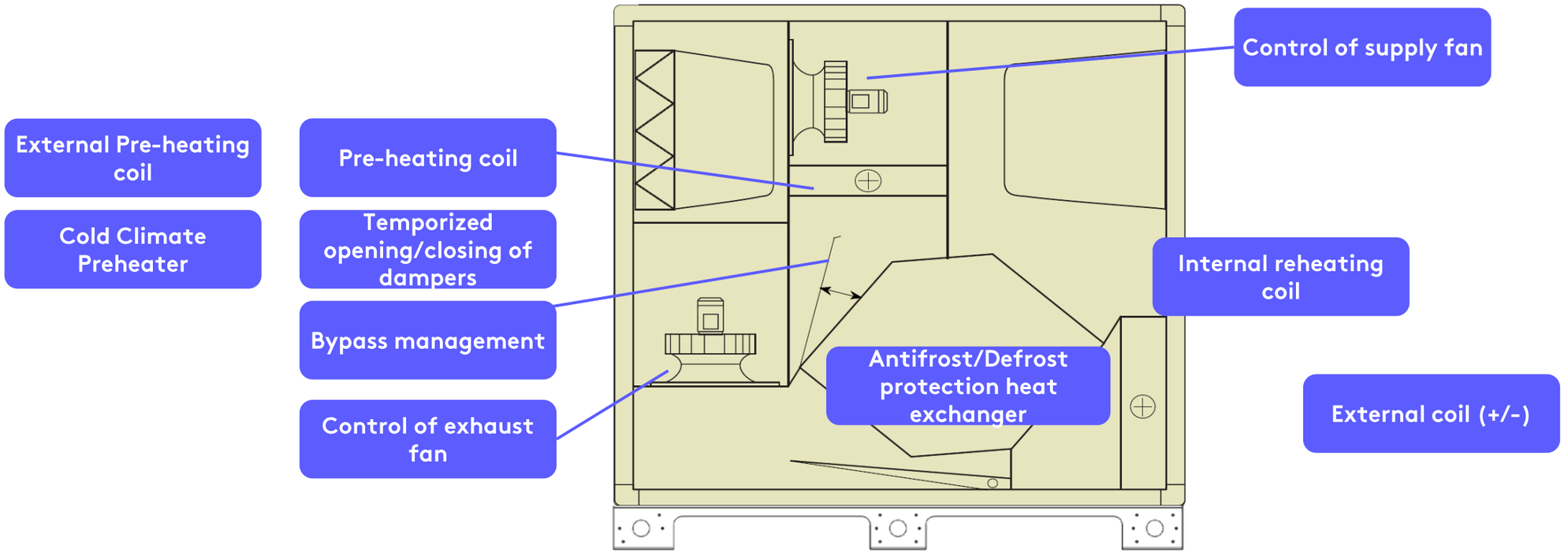
- **With rotary heat exchanger: GLOBAL RX, GLOBAL RX TOP, ESENSA RX TOP**



Introduction

TAC7 is applied on all aspect of energy recovery ventilation unit

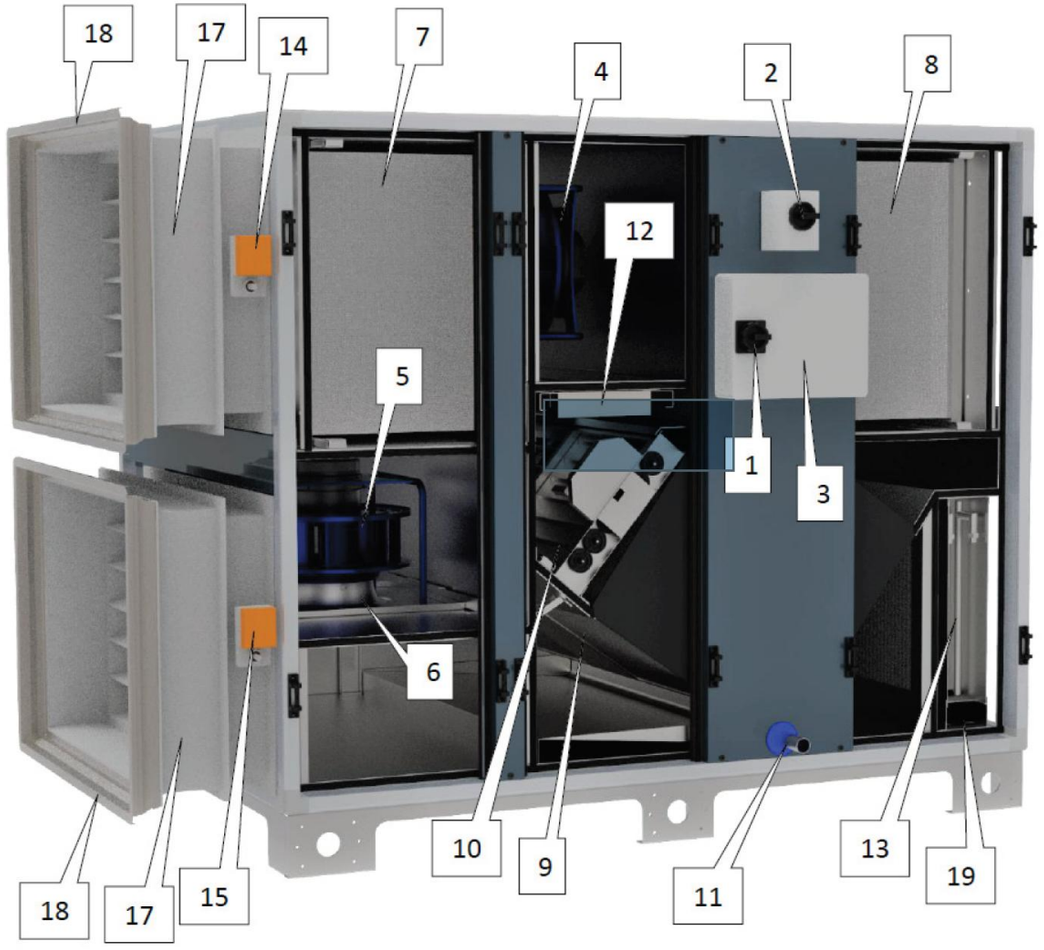
- Key principle: working point control without external sensors through control of the motor's torque and the rotation speed
- TAC7 allows to configure, control and visualize all parameters related to each element in the ventilation unit. Other functionalities include time slots, alarms (for several parameters or fire), boosts and advanced configurations



TAC7

Units Types

The TAC7 regulation handles 10 different types of units controlling TAC forward or backward fans, with counter flow or rotary heat exchanger



1. Main power switch
2. Main power switch for electrical coils (both internal pre-hating and post-heating)
3. Wiring box TAC6 controller
4. Supply fan
5. Extract fan
6. Kit CA -airflow measurement (option)
7. Outdoor air filter (bag or pleated)
8. Extract air filter (bag or pleated)
9. Heat exchanger (Plate)
10. Modulating 100% by-pass
11. Drain pan and drain pipe
12. Pre-heating electrical antifrost coil
13. Internal post-heating water or electrical coil (accessory)
14. Motorized damper (at outdoor air side - accessory)
15. Motorized damper (at exhaust air side - accessory)
17. Flexible connection(accessory)
18. Slip Clamps (accessory)
19. Water connection for postheating (accessory)

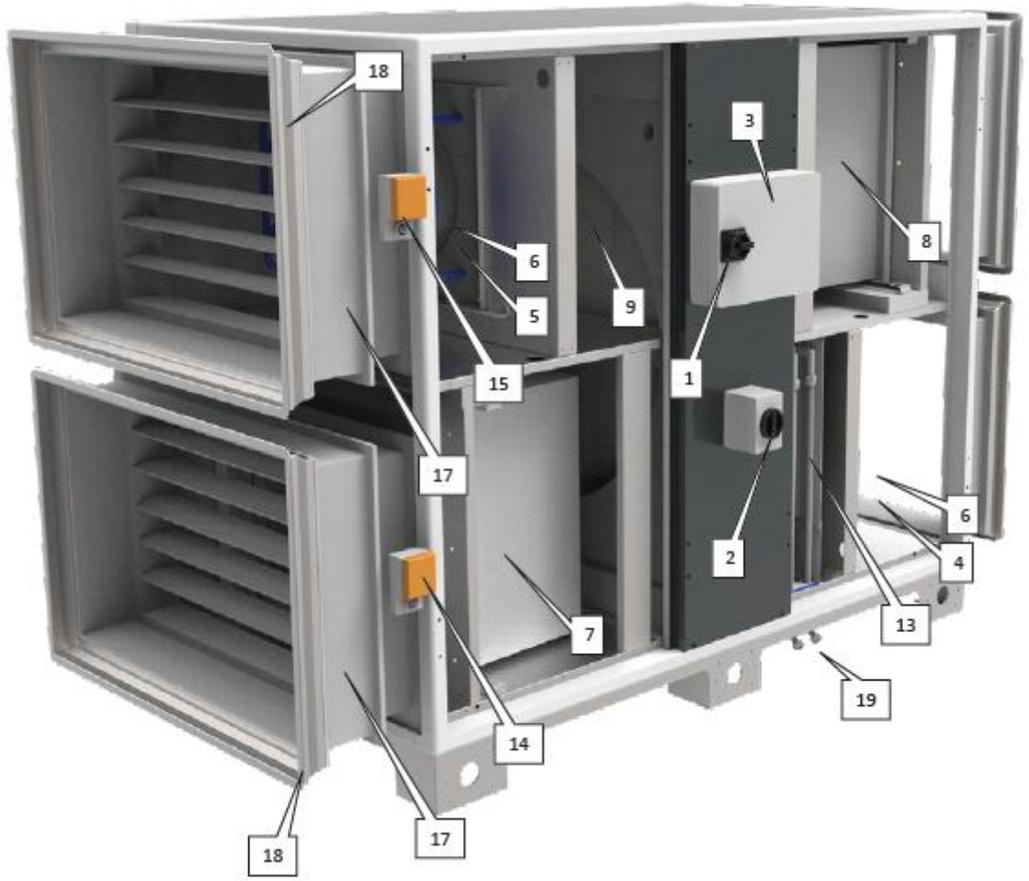
1, 2 and 3 must be installed by an accredited electrician

Note: internal electrical coils, motorized dampers, internal fan-pressure sensors, flexible connections and slip-clamps have to be ordered initially and are all pre-mounted and factory wired. Internal heating water-coil accessory is pre-mounted but has to be hydraulically and electrically connected by the installer.

TAC7

Units Types

- **GLOBAL RX**



1. Main power switch
2. Main power switch for electrical coils (both internal pre-hating and post-heating)
3. Wiring box TAC6 controller
4. Supply fan
5. Extract fan
6. Kit CA -airflow measurement (option)
7. Outdoor air filter (bag)
8. Extract air filter (bag)
9. Heat exchanger (Rotary)
13. Internal post-heating water or electrical coil (accessory)
14. Motorized damper (at outdoor air side - accessory)
15. Motorized damper (at exhaust air side - accessory)
17. Flexible connection(accessory)
18. Slip Clamps (accessory)
19. Water connection for postheating (accessory)

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TAC7

Units Types

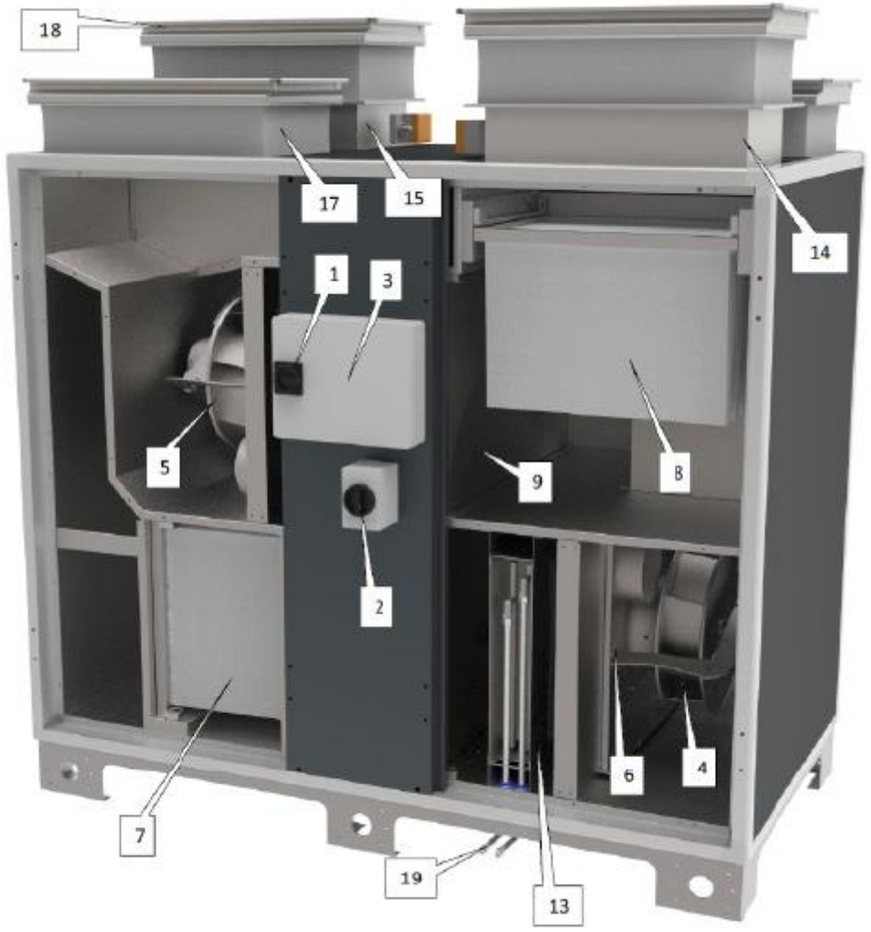
- **Global PX TOP**

1. EC Plug fan w/ composite fan blades (aluminium blades optional)
2. Fresh air filter ePM1≥60% filter class
3. Extract air filter ePM1≥50% filter class
4. Integrated TAC6 controller
5. High efficiency counterflow plate heat exchanger
6. Modulating 100% BYPASS
7. Stainless steel drain pan
8. Base frame for easy on site transport
9. Integrated post-heating (water/ electrical)
10. Integrated pre-heating (electrical)
11. Silencer

TAC7

Units Types

- **GLOBAL RX TOP**



1. Main power switch
2. Main power switch for electrical coils (both internal pre-hating and post-heating)
3. Wiring box TAC6 controller
4. Supply fan
5. Extract fan
6. Kit CA -airflow measurement (option)
7. Outdoor air filter (bag)
8. Extract air filter (bag)
9. Heat exchanger (Rotary)
13. Internal post-heating water or electrical coil (accessory)
14. Motorized damper (at outdoor air side - accessory)
15. Motorized damper (at exhaust air side - accessory)
17. Flexible connection(accessory)
18. Slip Clamps (accessory)
19. Water connection for postheating (accessory)

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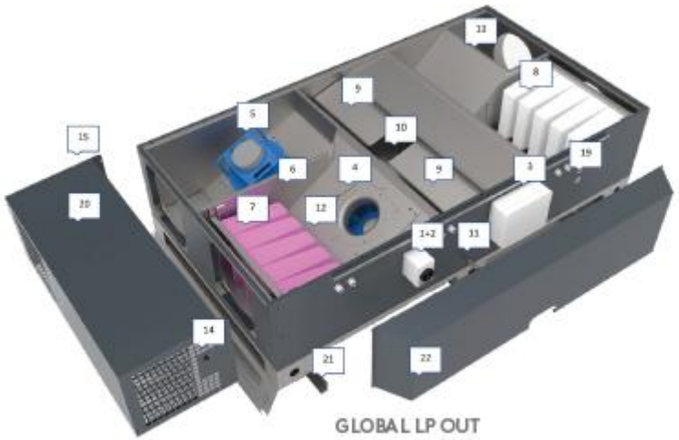
Note: internal electrical coils, motorized dampers, internal fan-pressure sensors, flexible connections and slip-clamps have to be ordered initially and are all pre-mounted and factory wired. Internal heating water-coil accessory is pre-mounted but has to be hydraulically and electrically connected by the installer.

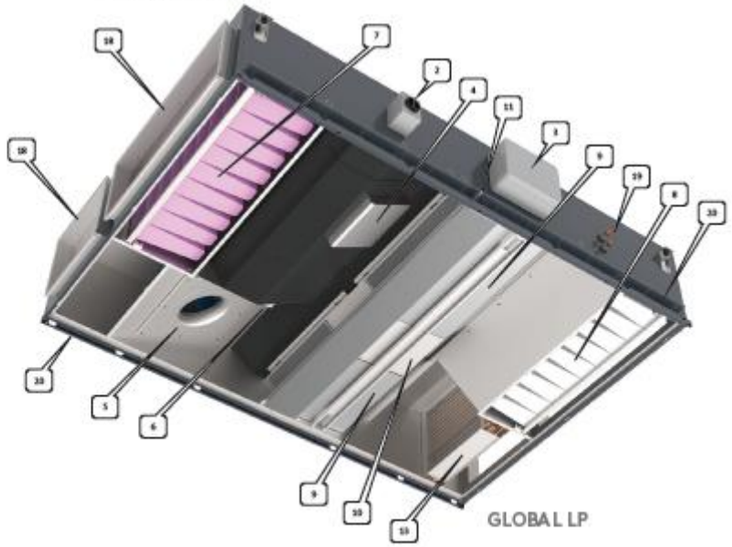
TAC7

Units Types

- **GLOBAL LP**



GLOBAL LP OUT



GLOBAL LP

1. Main switch for power supply AHU
2. Main switch for power supply electrical coils (both internal pre-hating and reheating)
3. Electrical cabinet
4. Supply fan
5. Extract fan
6. Kit CA -airflow measurement (option)
7. Outdoor air filter (bag or pleated)
8. Extract air filter (bag or pleated)
9. Heat exchanger (Plate or Rotary)
10. Modulating 100% bypass (PX only)
11. Drain pan and drain pipe (PX only)
12. preheater (PX only)
13. Internal reheating water or electrical coil (option)
14. Motorized damper (accessory)
15. Motorized damper (accessory)
16. Access panel
17. Flexible sleeve (accessory)
18. Slip clamp (accessory)
19. Water connection for reheating (accessory)
20. Box I/O (inlet / outlet)
21. Additional feet 205 mm (accessory)
22. Protection cover

TAC7

1, 2 and 3 must be installed by an accredited electrician

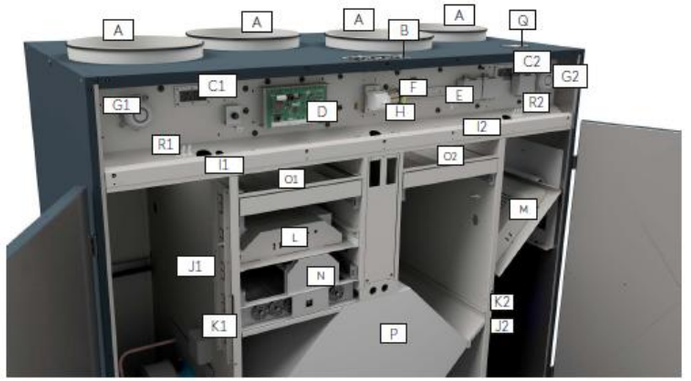
Note: internal electrical coils, motorized dampers, internal fan-pressure sensors, flexible connections and slip-clamps have to be ordered initially and are all pre-mounted and factory wired. Internal heating water-coil accessory is pre-mounted but has to be hydraulically and electrically connected by the installer.

Units Types

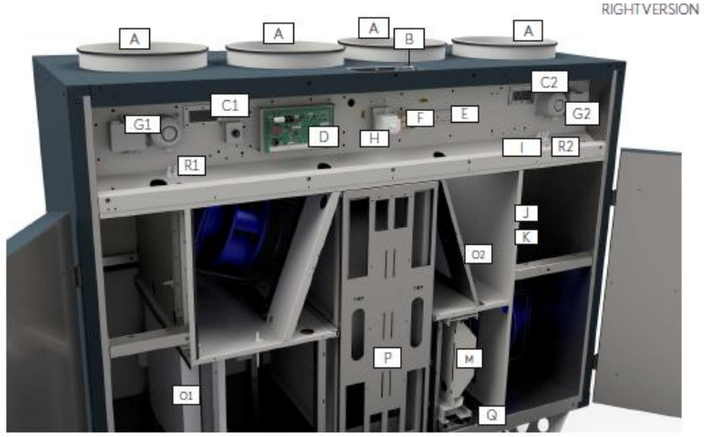
- **ESENSA PX/RX TOP**

RIGHT VERSION

1. Main switch
2. Cable inlet
3. Integrated electrical cabinet
4. Supply air fan
5. Extract air fan
6. Supply air filter(mini-pleated)
7. Extract air filter (mini-pleated)
8. High efficiency plate heat exchanger
9. Integrated preheating | electrical (option)
10. Bypass
11. Integrated postheating electrical/water (option)
12. Drain pan
13. Hydraulic connection for postheating (option)
14. Base frame



RIGHT VERSION

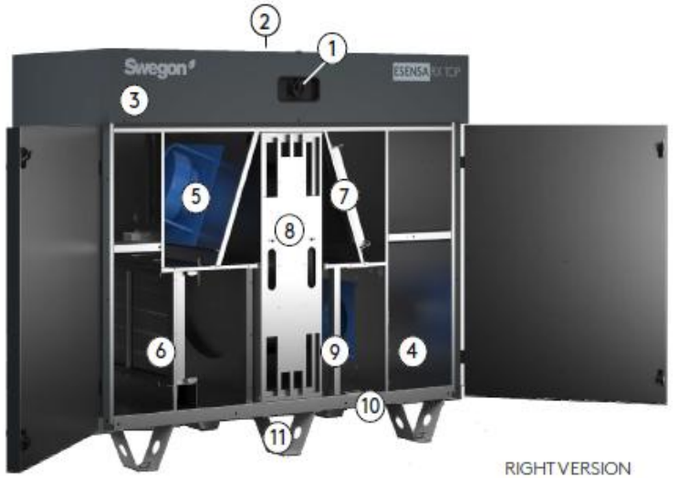


RIGHT VERSION

A. Duct connection (circular or rectangular)
B. Cable gland
C1/C2. Membrane entry grommet (control cable)
D. Main board
E. Slotted DIN rail (free space for other components)
F. Electric terminal block + Earth wire connector
G1/G2. Pressostat
H. Power supply/switch
I1/I2. Membrane entry grommet (supply cable)
J1/J2. Holding rail (control cable)
K1/K2. Holding rail (supply cable)
L. Preheating coil location (electrical)
M. Postheating coil location (electrical/water)
N. Bypass
O1/O2. Mini-pleated filter
P. Counter air flow heat exchanger/Rotary heat exchanger
Q. Hydraulics connection membrane
R1/R2. Pressure tappings

ESENSA RX TOP

1. Main switch
2. Cable inlet
3. Intergrated Electrical cabinet
4. Supply air fan
5. Extract air fan
6. Supply air filter(mini-pleated)
7. Extract air filter (mini-pleated)
8. High efficiency rotary heat exchanger
9. Integrated postheating | water/electrical (option)
10. Hydraulic connection for postheating (option)
11. Base frame



RIGHT VERSION

TAC7

Note: internal electrical coils, motorized dampers, internal fan-pressure sensors, flexible connections and slip-clamps have to be ordered initially and are all pre-mounted and factory wired. Internal heating water-coil accessory is pre-mounted but has to be hydraulically and electrically connected by the installer.

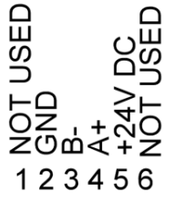
Control Board

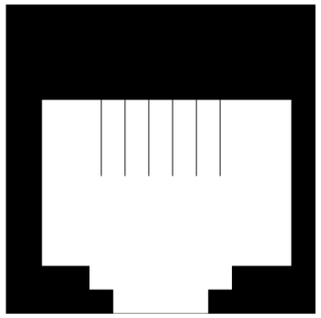
TAC7 regulation hardware consists in 1 unique board to control any air handling unit

- **TAC7 Schematic**

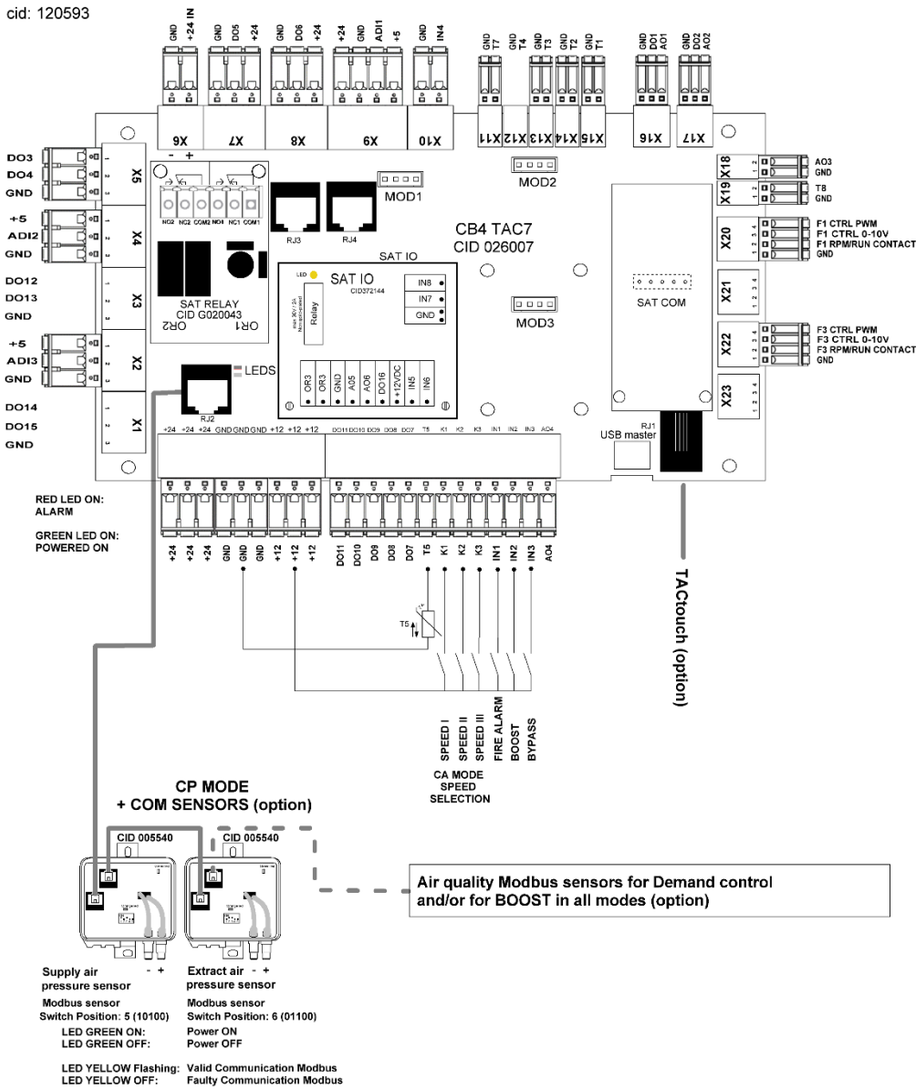
Electronic boards contains ESD sensitive components.
Wear antistatic wrist strap connected to protective earth before to manipulate them.
In alternative, discharge by touching the unit, handle boards at corners only and use antistatic gloves.

RJ12 PINOUT





RJ12



TAC7

OPERATION CONNECTIONS

IN1 - FIRE ALARM
IN2 - BOOST
IN3 - BYPASS ACTIVATION OVERRIDE

AO4 - IBA= output 0-10V for internal waterborne reheater (option)

K1 - CA MODE: External speed 1 (N.O.)
DEMAND/ CP MODE: External start (N.O.)
K2 - CA MODE: External speed 2 (N.O.)
DEMAND / CP MODE: 0-10V (Max. impedance: 1.500 Ohms)
K3 - CA MODE: External speed 3 (N.O.)
DEMAND / CP MODE: 0-10V (Max. impedance: 1.500 Ohms)

T5 - supply air T°

DO7 - HEAT OUTPUT (open collector; Vmax=24 VDC; Imax=0,1 A)
DO8 - COOL OUTPUT (open collector; Vmax=24 VDC; Imax=0,1 A)
DO9 - ALARM OUTPUT (open collector; Vmax=24 VDC; Imax=0,1 A)
DO10 - AL dPA OUTPUT (open collector; Vmax=24 VDC; Imax=0,1 A)
DO11 - FAN ON OUTPUT (open collector; Vmax=24 VDC; Imax=0,1 A)

+12 : +12V DC (min: +11,49V DC; max: +12,81V DC). 0,3 A max
+24 : +24V DC (min: +22V DC; max: +26V DC). 0,8 A max

OPTIONS CONNECTIONS

X2 | ADI3 - EXTRACT FILTER dPa (option)
X3 | DO12 - Cold Climate Preheater
= output PWM for external electric preheater power regulation (option)
X4 | ADI2 - SUPPLY FILTER dPa (option)
X5 | DO3 - BYPASS OPEN- PX (with rotary actuator - prewired)
| DO4 - BYPASS CLOSE - PX (with rotary actuator - prewired)
X6 | +24 IN - GND: +24 VDC power supply for the board (prewired)
X7 | DO5 - DAMPER 1 (with or without spring return, Imax = 0,5 A DC) (option)
X8 | DO6 - DAMPER 2 (with or without spring return, Imax = 0,5 A DC) (option)
X9 | ADI1 - BYPASS POS - PX | RX SPEED FEEDBACK - RX (prewired)
X10 | IN4 - Drain pan full contact (for LP)
X11 | T7 - IBA/EBA+ frost protection T° sensor (option)
X13 | T3 - Exhaust T° sensor - PX (prewired)
X14 | T2 - Extract air T° sensor (prewired)
X15 | T1 - Eutdoor air T° sensor (prewired)
X16 | AO1 - EBA+ = output 0-10V for external waterborne reheater (option)
| DO1 - KWout = output PWM for electric reheater power regulation (option)
X17 | DO2 - PX: KWin = output PWM for electric preheater power regulation (option)
| DO2 - RX: ROTOR SPEED PWM (prewired)
X18 | AO3 - EBA-/REVERSIBLE = output 0-10V for external waterborne recooler or reversible battery (option)
X19 | T8 - EBA-/REVERSIBLE frost protection T° sensor (option)
| T8 - DEFROST CONTACT FOR HEAT PUMP (option)
X20 | F1 - FAN 1 (SUPPLY)
X21 | F2 - FAN 2 (SUPPLY - additional fan)
X22 | F3 - FAN 3 (EXHAUST)
X23 | F4 - FAN 4 (EXHAUST - additional fan)

FIELD BUSES

RJ1: RJ12 connector for TACtouch (option)
RJ2: RJ12 connector for Modbus Pressure sensors for CP mode
Modbus Air quality sensors for demand control mode (option)
Modbus Air quality sensors for BOOST in all modes (option)
RJ3: RJ12 connector for ESENSA or GLOBAL LP: free
for GLOBAL PX/RX: Modbus Pressure sensors kit CA (prewired)
and/or filters monitoring (option - prewired), on supply flow
and/or defrost detecting (option - prewired)
RJ4: RJ12 connector for Modbus Pressure sensors kit CA (prewired)
and/or filters monitoring (option - prewired);
NB: for GLOBAL PX/RX: sensor used for extract flow only

SATELLITES CONNECTIONS

SAT IO OR3-OR3: BYPASS STATUS - (option)
SAT IO AO5: 0-10V OUTPUT (airflow / pressure) - (option)
SAT IO AO6: 0-10V OUTPUT (airflow / pressure) - (option)
SAT IO IN5: MASTER SELECTION - (option)
SAT IO IN6: HEAT OFF - (option)
SAT IO IN7: SUPPLY RUN IN FIRE ALARM (open) (option)
SAT IO IN8: EXHAUST RUN IN FIRE ALARM (open) - (option)

SAT COM - SAT MODBUS or SAT KNX or SAT SAT WIFI-ETHERNET or
SAT WIFI-ETHERNET-MQTT - (option)

SAT RELAY
FOR GLOBAL LP, THEN PREMOUNTED AND PREWIRED
SAT RELAY OR1 - LINEAR ACTUATOR FOR BYPASS - FORWARD (closed) (prewired)
SAT RELAY OR2 - LINEAR ACTUATOR FOR BYPASS - BACKWARD (closed) (prewired)
FOR ALL OTHER MODELS
SAT RELAY OR1 : Enable Heat Pump - (option)
SAT RELAY OR2 : Heat/Cool selection for Heat Pump/Chiller - (option)
relais SPDT (COM + NC/NO) – max 0,5A 30V AC/DC
In absence of a heat pump, these outputs can be configured as alternative for a function assigned by default to DO7...DO11.

Control Boards Types

- **Hardware Features:**
  - 3 contacts for fans control (K1-K2-K3)
  - 4 EC fans control connectors:
    - 2 per flows (supply and exhaust)
    - PWM or 0-10V fan motor percentage of maximal torque control
    - Speed feedback signal or fan run contact (RPM)
  - 4 digital inputs (IN1 to IN4)
  - 7 Temperatures input (T1 to T5, then T7 and T8)
  - 4 analogue outputs (AO1 to AO4)
  - 1 PWM output for rotary heat exchanger rotation stepless speed control
  - 5 digital outputs for external relay activation or direct connection if electrical range respected (Vmax=24 VDC; Imax=0,1 A)
  - 5 analogue inputs

Control Boards Types

- Hardware Features (continue):
  - 2x Inlet Damper Opening/Closing outputs controlled separetelly
  - Bypass control: all or nothing / modulating
  - Internal electrical preheating regulation contacts (KWin)
  - Internal electrical reheating regulation contacts (KWout)
  - Internal waterborne reheating regulation contacts (AO4)
  - +24 : +24V DC (min: +22V DC; max: +26V DC). 0,8 A max. For external sensors/servomotors.
  - +12 : +12V DC (min: +11,49V DC; max: +12,81V DC). 0,3 A max. For contacts wiring.
  - Satellite boards:
    - 1 x SAT RELAY (used on LP unit for bypass actuator, on other units: 2x output relays dry contact max 0,5 A 30 V AC/DC)
    - SAT IO (extension of Input/output)
    - Communication SAT: SAT Modbus or SAT KNX or SAT WIFI-ETHERNET(-MQTT)

Control Boards Types

- Hardware Features (continue):
  - 4 RS 484 ports, Modbus master, on RJ12 connectors
    - RJ1: TACtouch connection, can be configured as Modbus slave port (see Interface section)
    - RJ2: connection for external sensors, like Modbus pressure sensors for constant pressure mode (see software features)
    - RJ3&4: connection for internal sensors. Modbus pressure sensors for constant airflow mode (kit CA) and/or for defrost function. RJ3 can be configured as Modbus slave port (see software features).
  - 1 USB C port: can be used for firmware upgrade and interface port (see Upgrade and Interface section). Feature available from version 1.0.10.66.

Control Boards Types

- **Software Features:**
  - **Fans Control:**
    - **Constant Airflow mode (CA)**
    - **Demand control mode (LS): linearly link airflow to 2x0-10V signals or air quality sensors CO2/VOC/RH/Fine dust : external sensors – analogue/Modbus, internal serial communication Sensors.**
    - **Constant Pressure mode (CP) with external pressure sensors – analogue/Modbus**
    - **Constant torque mode (TQ)**
  - **Master selection: determination of the fans speed by contacts K1,K2, K3 (default) or by user interface.**
  - **Boost function: on contact, button interface/hardware eventually temporized, based on sensor level (CO2/VOC/RH/Fine dust, analogue/Modbus)**

Control Boards Types

- Software Features (continue):
  - Backward fans management:
    - With or without pressure sensors (for airflow modulation). Analogue or Modbus (CA) pressure sensor
    - With rotation speed feedback or run contact
  - Control fans power with PWM or 0-10V signal
  - Interfacing with TACtouch remote control
  - Integration with BMS: Modbus, KNX, Ethernet, Wi-Fi, BACnet. Need extra communication SAT, only one at a time
  - Cloud Connectivity: with optional SAT WIFI-ETHERNET-MQTT
  - Time based features:
    - Time schedules
    - Running and maintenance hours
    - Season management

Control Boards Types

- **Software Features (continue):**
  - **Comfort:**
    - **Freecooling with temperature set point (modulating by-pass or rotary heat exchanger speed modulation) or not (all or nothing by-pass). Configuration of the specific period and time.**
    - **Internal reheating (Electrical/Waterborne) regulation - option**
    - **External reheating (Electrical/Waterborne/Heat pump) regulation and eventually cascade possibility with internal one - option**
    - **External recooling coil regulation (Waterborne/Chiller) - option**
    - **Comfort regulation based on Supply or Extract/Room/HMI air temperature**
    - **Automatic heat/cool change over with reheater and recooler with possibility of contacts for HEAT and COOL indication**

Control Boards Types

- **Software Features (continue):**
  - **Inlet/Outlet dampers management with configurable opening time. With or without spring return. Supply and exhaust controlled separately.**
  - **Anti-frost protection of plate heat exchanger:**
    - **With airflow reduction**
    - **With optional internal electric pre-heating coil KWin regulation**
    - **With optional external waterborne pre-heating coil IEBAin regulation**
    - **With modulating by-pass anti-freeze management**
    - **Defrost backup with kit CA and pressure drop detection due to frost**
    - **Defrost backup with detection of too low supply temperature**
  - **Anti-frost protection of rotary heat exchanger:**
    - **With rotary heat exchanger speed modulation**

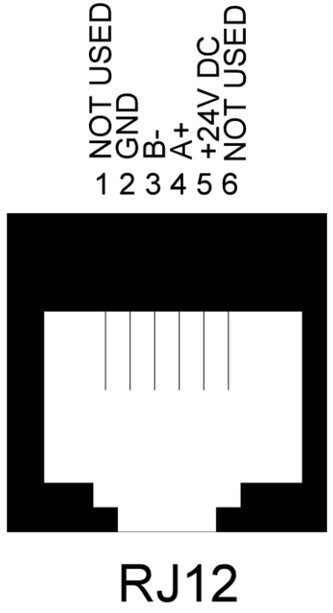
Control Boards Types

- **Software Features (continue):**
  - **Alarms and monitoring:**
    - **Default alarm on DO9 output**
    - **Fire alarms extended management (with activation contacts of the supply and exhaust airflows in case of alarm). NO (Normally Open) input contact, can be configured to NC.**
    - **Pressure alarm with dedicated output on DO10**
      - **computed (only for CA/LS mode and with airflow modulation) and filters clogging level monitoring**
      - **with external pressure sensors on filters and their clogging level monitoring**
      - **with external pressure switch on filters.**
    - **Drain pump alarm management for Low Profile (LP) model**
    - **Running Fan status on DO11 output**

Fieldbus

- **Modbus for master devices:**
  - Modbus master devices are:
    - TACtouch: graphical touch screen remote control on RJ1 connector. As master, TACtouch can control several units within a short distance (100 meters max).
      - Port RJ1 configured as slave port: with a Modbus address different from value 0.
      - TACtouch configured as Master (default).
    - Communication Protocols Gateways: Modbus to other communication gateway can be connected near to TAC7 control board (inside the AHU) and acts as master on RJ3 connector configured as slave port: with a Modbus address different from default value 0.

RJ12 PINOUT



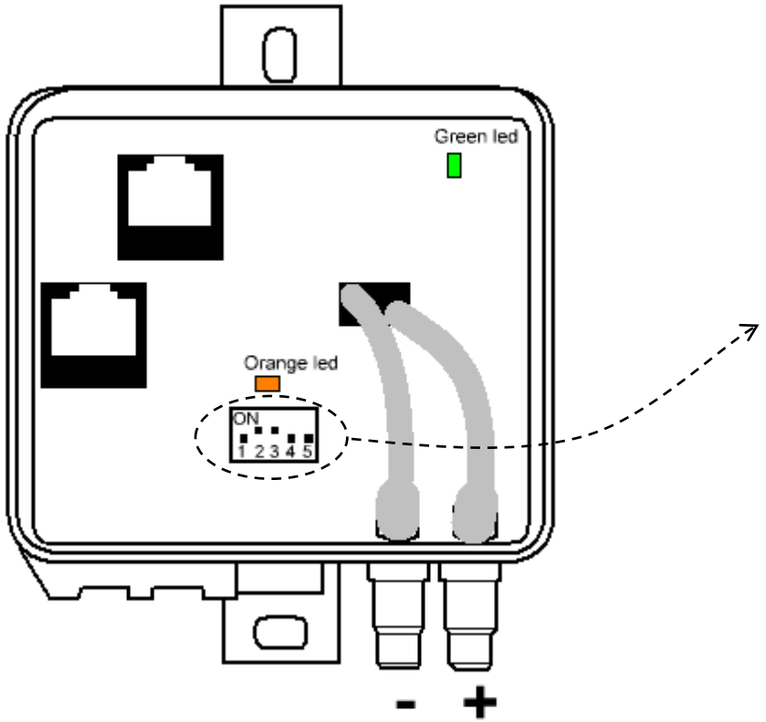
RJ12

Fieldbus

- **Modbus for slave devices:**
  - Modbus slave devices are:
    - TACtouch: graphical touch screen remote control on RJ1 connector. It is possible to connect multiple TACtouch (max 3) provided that their Modbus Slave address is different for each of them.
      - Port RJ1 configured as master : with a Modbus address 0.
      - TACtouch configured as slave. Modbus Address = 2, 3 or 4.
    - Filters Pa: Modbus pressure sensor used to monitor supply and exhaust filters level clogging (on RJ4 connector). There can be 1x single sensor on supply filter and 1x single sensor on extract filter or only 1 dual sensor for both filters.
    - CA dPa: Modbus pressure sensor mounted at the backward fans inlet in order to enable the use of the constant airflow (CA) mode on units equipped with such fans (on RJ3/4 connector). There can be 1x single sensor on supply fan and 1x single sensor on extract fan or only 1 dual sensor for both fans.
    - AF dPa: Modbus pressure sensor used to measure the pressure drop on the plate heat exchanger in the exhaust flow provided that the units is working in airflow modulation and not in torque. Frost is detected thanks to the level of the pressure drop (on RJ3/4 connector).
    - CP Pa: Modbus pressure sensor used in constant pressure (CP) mode, for supply and/or exhaust flow (on RJ2 connector)
    - Air quality sensors for CO2/RH/VOC measuring (on RJ2 connector). See section Functions/Air flow/Demand Control for details

Fieldbus

- **Modbus for slave devices:**
  - Address setting on Modbus pressure sensors:

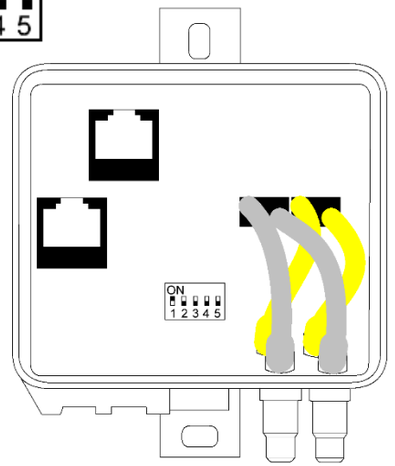


GREEN LED ON: Power ON
GREEN LED OFF: Power OFF

ORANGE LED Flashing: Valid Modbus Communication
ORANGE LED OFF: Invalid Modbus Communication

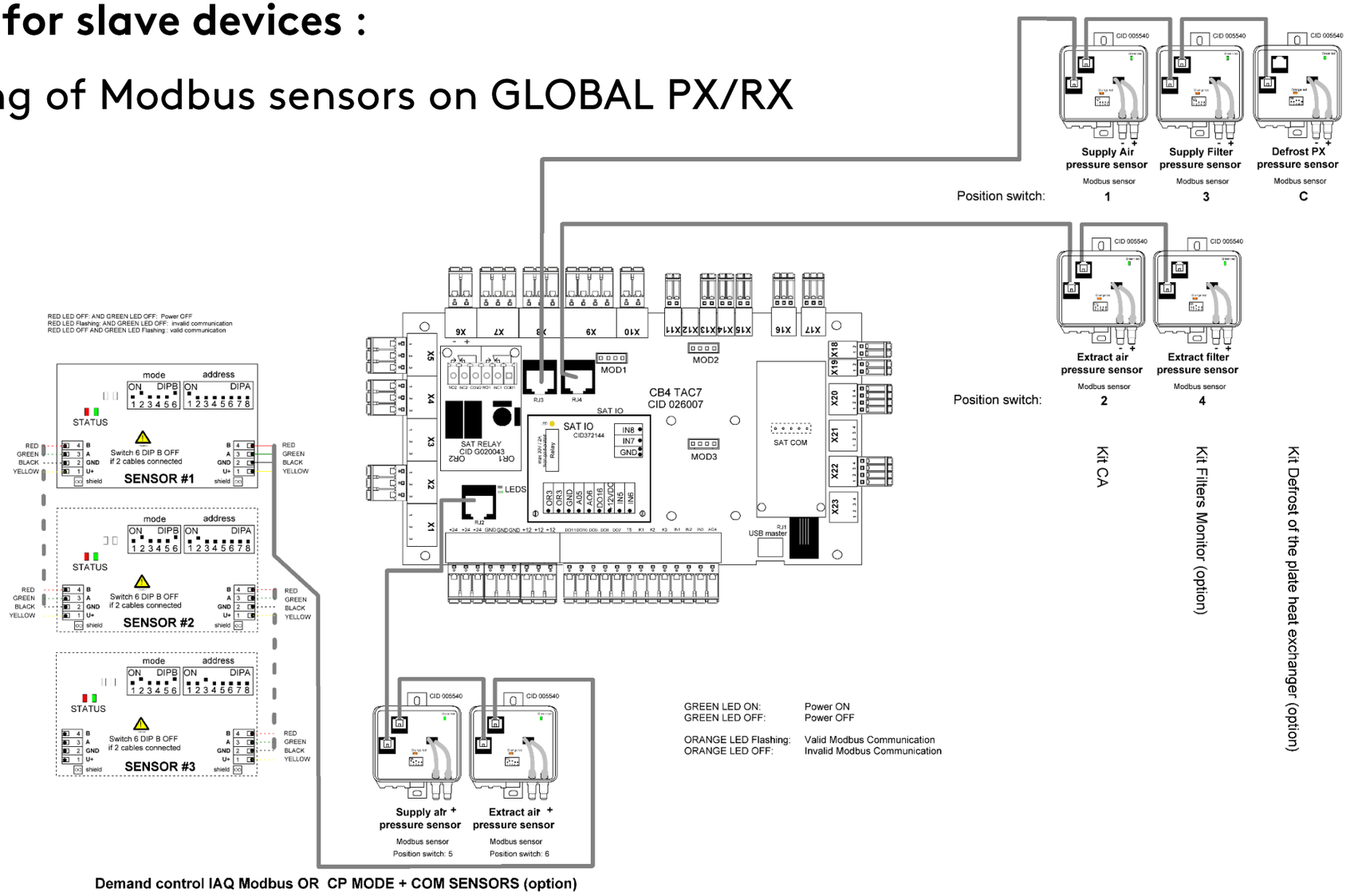
Mode	Supply	Exhaust
CP	5	6
CA*	1	2**
Defrost*		C
Filters*	3	4**

* = factory installed
** = if 2 physical sensors and not 1 dual (with dual sensor, exhaust pressure measurement uses bottom row of pipes,
The ones highlighted in yellow in the picture here at right side)



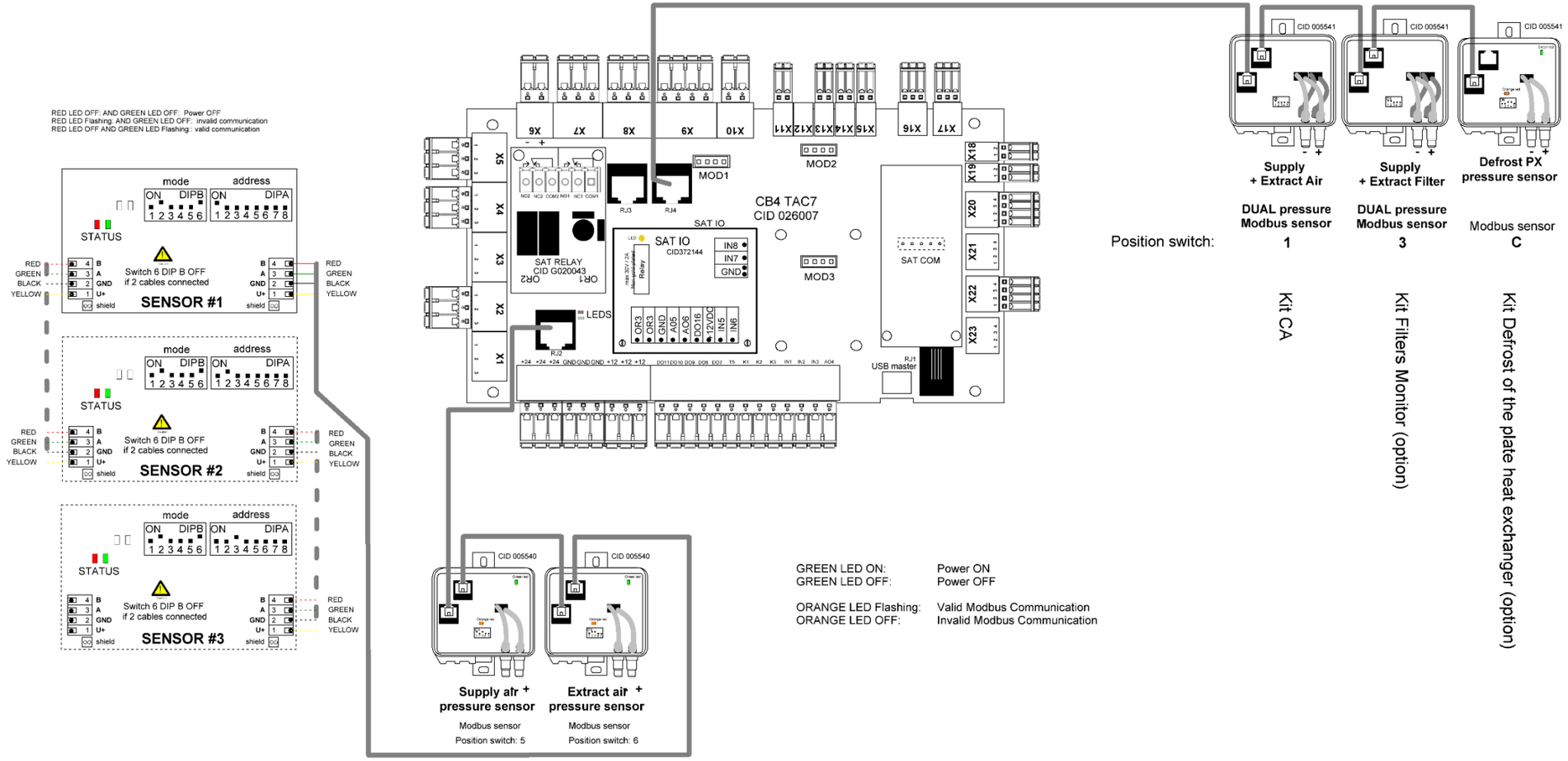
Fieldbus

- **Modbus for slave devices :**
  - Wiring of Modbus sensors on GLOBAL PX/RX



Fieldbus

- **Modbus for slave devices :**
  - Wiring of Modbus sensors for GLOBAL PX LP | ESENSA



Fieldbus

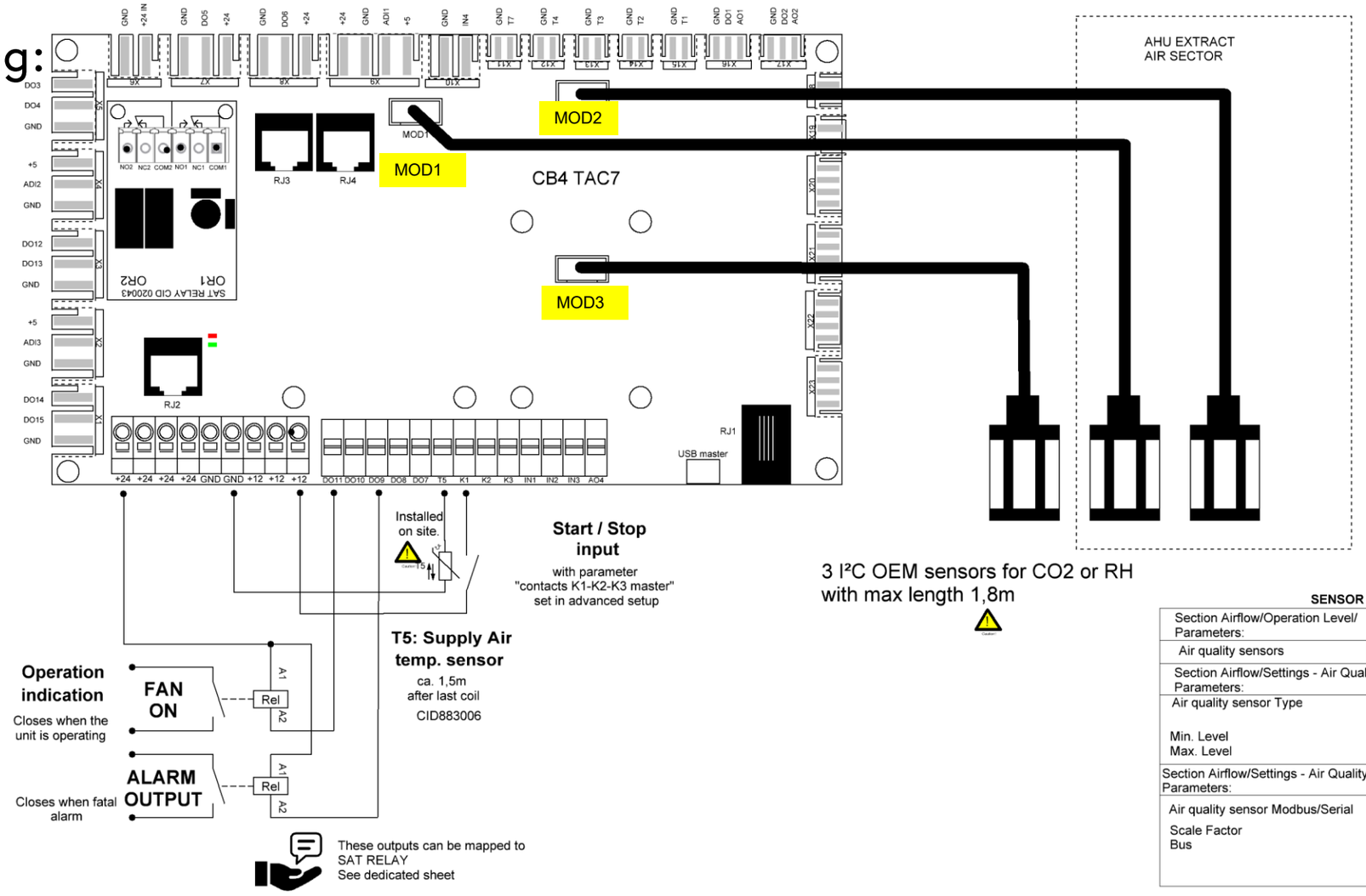
- **Modbus for slave devices:**
  - Wiring of Modbus pressure sensors:
    - premounted options:
      - Kit Filters Supply: connected on RJ 4 connector
      - Kit CA Supply: connected on Kit Filters Supply if present otherwise on connector TAC7-RJ 4
      - Kit Filters Extract: connected on Kit CA Supply (in some configuration on RJ 3 connector, configured as master)
      - Kit CA Extract: connected on Kit Filters Extract if present, otherwise on Kit CA Supply (in some configuration on RJ 3 connector, configured as master)
      - Kit Defrost: connected on Kit CA Extract
    - Installation mounted options:
      - Kit CP Supply: connected on RJ 2 connector
      - Kit CP Extract: connected on Kit CP Supply if present, otherwise on RJ 2 connector

Fieldbus

- **I²C:**
  - Support of CO2 and RH I²C sensors:
    - 3 plugs: MOD 1, 2, 3 (MOD stand for module)
    - Max length: 1,8m
    - Cost effective.
    - Simple wiring
    - Adapted for prewired and premounted options in exhaust sector for models having short distance between this last location and the one of the control board.
    - Air quality sensors can be configured as analogue 0-10V, Modbus or serial com for I²C.

Fieldbus

- I²C:
  - Wiring:



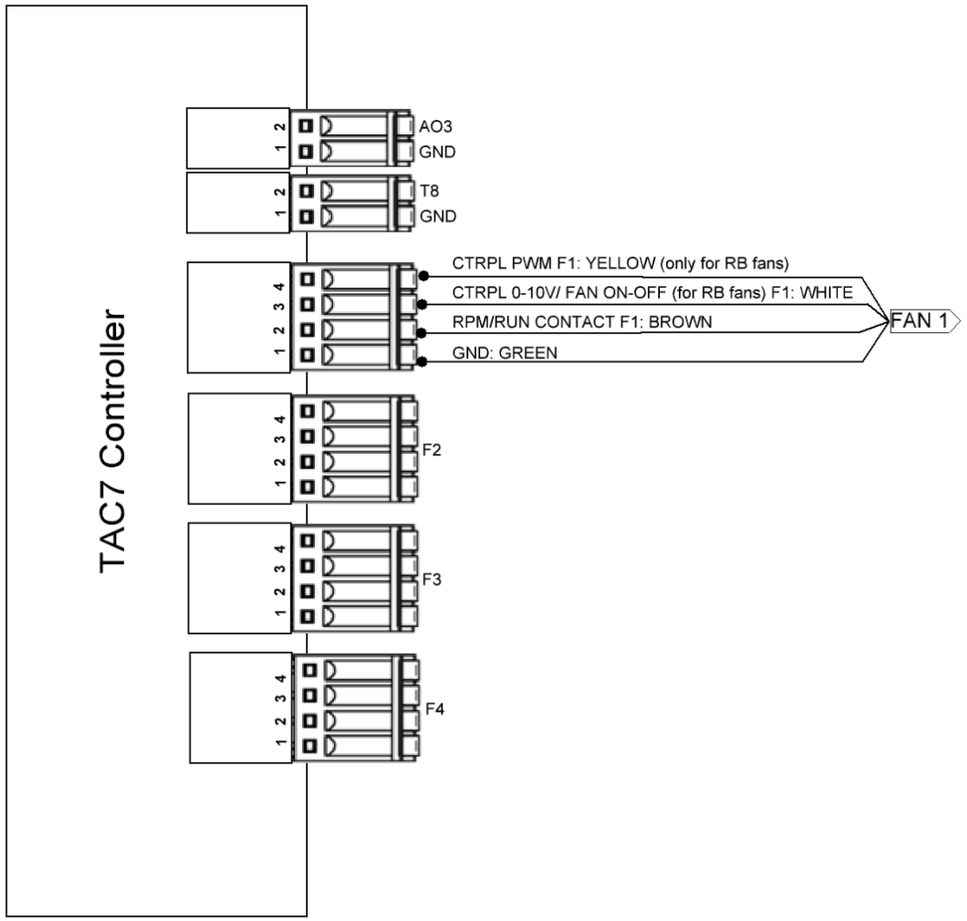
SENSOR CONFIGURATION

Section Airflow/Operation Level/ Parameters:		
Air quality sensors	1, 2 or3	
Section Airflow/Settings - Air Quality sensors - Type/ Parameters:		
Air quality sensor Type	SERIAL CO2/Humidity CO2 [ppm]| RH [%]	
Min. Level Max. Level	0 min 5000 max	0 min 95 max
Section Airflow/Settings - Air Quality sensors - Modbus / Serial/ Parameters:		
Air quality sensor Modbus/Serial	CO2 [ppm]|| RH [%]	
Scale Factor Bus	1	1
	BUS#1 I2C1 (MOD1)/ BUS#2 I2C2 (MOD2)/ BUS#3 I2C3 (MOD3)	

TAC7

Fans INPUT/OUTPUT

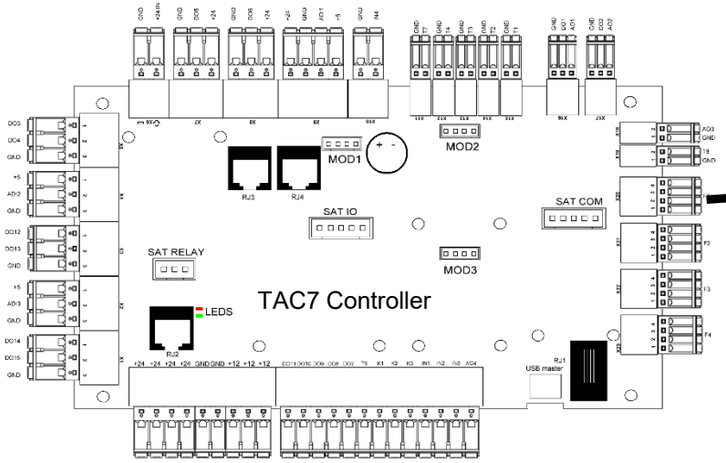
- **Fan connector**
  - Pinout



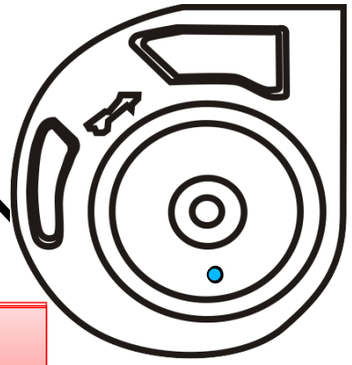
TAC7

Fans INPUT/OUTPUT

- **Working principle with forward fans**



FAN 1



30% max torque = 77

PWM

PWM

0-10V

FAN SEND BACK SPEED

RPM

750

TORQUE AND SPEED GIVES A UNIQUE WORKING POINT THANKS TO PREVIOUS RELIABLE MAPPING OF ISOTORQUE CURVES: AIRFLOW AND PRESSURE ARE KNOWN

SETPOINT: Q = 0833 m3/h
ACTUAL VALUES
Q=0000 m3/h
P=0000 Pa

TAC7

Fans INPUT/OUTPUT

- **Working principle with backward fans**

Backward fans don't have airflow-pressure curves that allow to retrieve a unique working point with sent torque and returned speed.
If the airflow must be known, a pressure sensor at the fan inlet must be placed (see CA kit section) and the following formula must be applied:
$Q = k.\sqrt{dP}$
Where

Q: airflow [m3/h]
dP: pressure variation at fan inlet [Pa]
k: characteristic constant k factor of the fan type in use

Otherwise, only the torque will be modulated.

Finally, backward fans may not return the actual speed but only open a run contact instead. Then the RPM wire of the fan connector will work as a simple digital input (0: stop or 1: run).

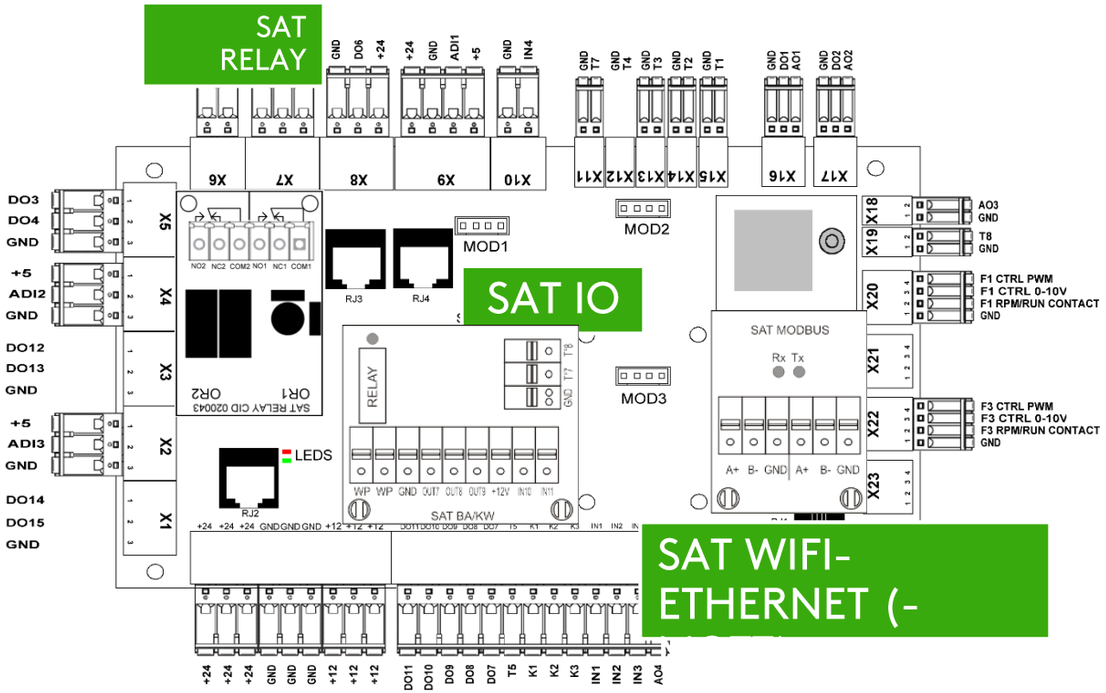
Satellite boards

The satellites boards are optional circuits foreseen to be plugged on the TAC7 main board in order to give the hardware resources to fulfil specific functions.

- **Features**
  - SAT IO: Input/Output Extension
  - SAT RELAY: mandatory used for GLOBAL LP unit to drive the linear actuator of the bypass (premounted and wired). For other models, used as dry contact outputs.
  - SAT MODBUS: enables modbus communication
  - SAT KNX: enables KNX communication
  - SAT WIFI-ETHERNET: enables Wi-Fi and Ethernet communication
  - SAT WIFI-ETHERNET-MQTT: same as SAT WIFI-ETHERNET plus access to Cloud.
  - All the satellite boards are optional, excepted the SAT RELAY for LP units

Satellite boards

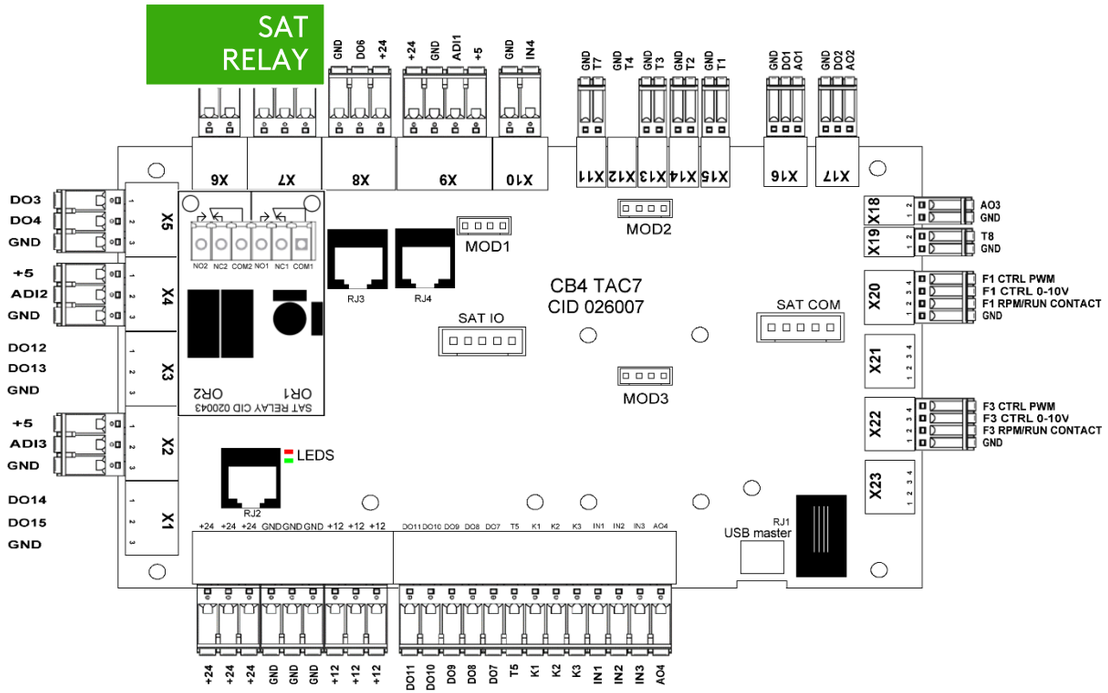
- **Summary**



Electronic boards contains ESD sensitive components.
Wear antistatic wrist strap connected to protective earth before to manipulate them.
In alternative, discharge by touching the unit, handle boards at corners only and use antistatic gloves.

Satellite boards

- **SAT RELAY:** CID 020043 - mandatory used for GLOBAL LP, then premounted and prewired – option for other models
  - SAT RELAY OR1 – relay SPDT (COM + NC/NO) – max 0,5A 30V DC
  - SAT RELAY OR2 – relay SPDT (COM + NC/NO) – max 0,5A 30V DC



Electronic boards contains ESD sensitive components.
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In alternative, discharge by touching the unit, handle boards at corners only and use antistatic gloves.

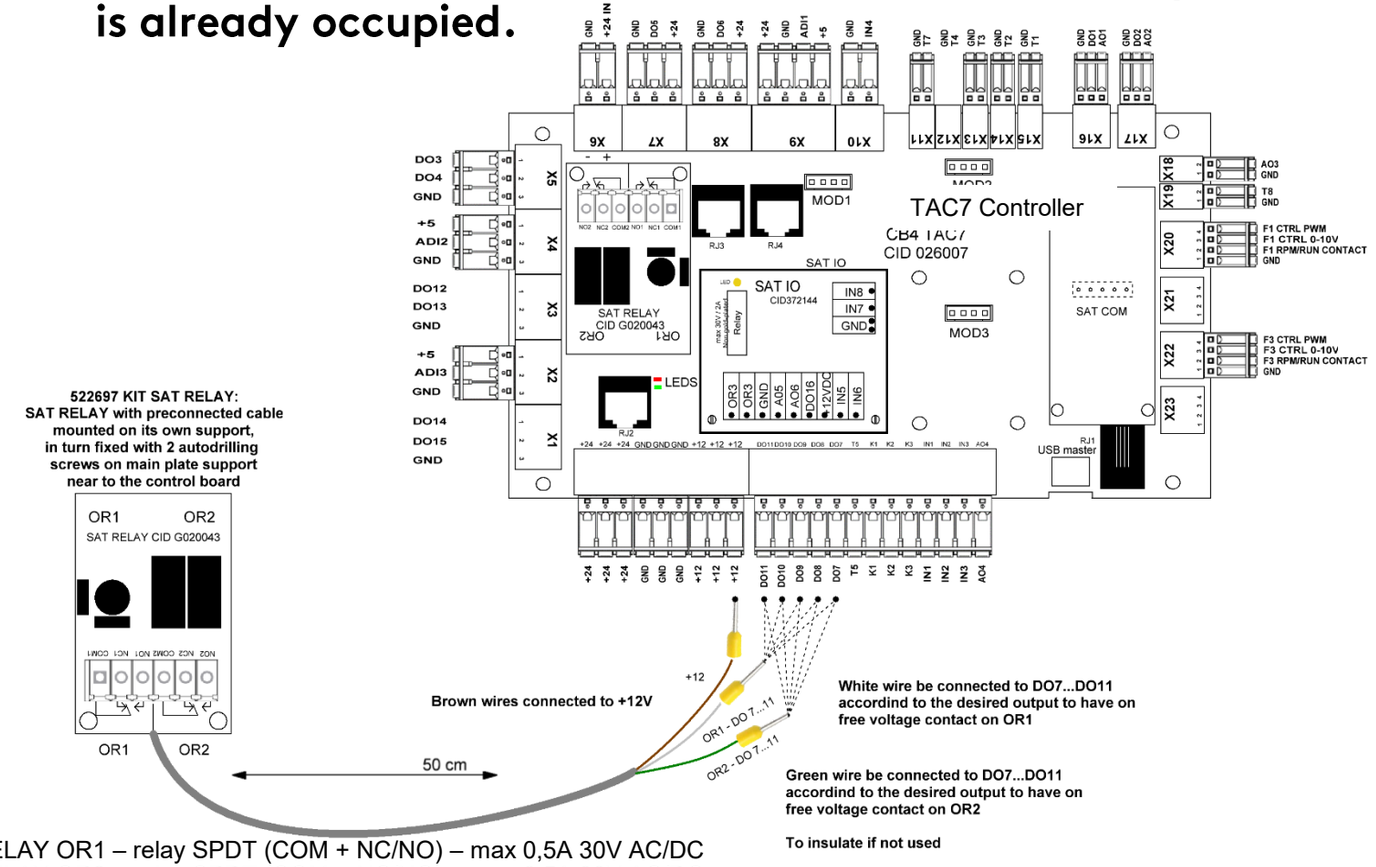
Satellite boards

- **SAT RELAY: 2 x relay SPDT (COM + NC/NO) – max 0,5A 30V DC**

Unit Type	SAT RELAY	
	O.R.1	O.R.2
GLOBAL LP	Linear actuator for LP linear bypass actuator - forward)	Linear actuator for LP linear bypass actuator - backward
Other models	Voltage free output that can be mapped to other function (HEAT or COOL contact, FAN ON indication, default alarm, pressure alarm). Settings: Allow I/O mapping in section Inputs/Outputs / Settings: - User Digital I/O Mapping: ON Select desired functions to be mapped on SAT RELAY OR1 or OR2 in section Inputs/Outputs / User Digital I/O Mapping – Outputs: - Circulator pump for waterborne reheater/reversible (by default on DO7) - Circulator pump for waterborne cooler (by default on DO8) - Default Alarm status (by default on DO9) - Pressure Alarm status (by default on DO10) - Fan On status (by default on DO11) - Bypass status (by default on SAT IO OR3) - Heat status (by default unmapped) - Cool status (by default unmapped) - Circulator pump for waterborne preheater (by default unmapped)	

Satellite boards

- **SAT RELAY:** CID 020043 – used in KIT SAT RELAY CID 522697.
  - SAT RELAY with preconnected cable mounted on its own support, in turn fixed with 2 auto drilling screws on main plate support near to the control circuit board
  - Can be used (more than 1) on all models when the position on board for the SAT RELAY is already occupied.

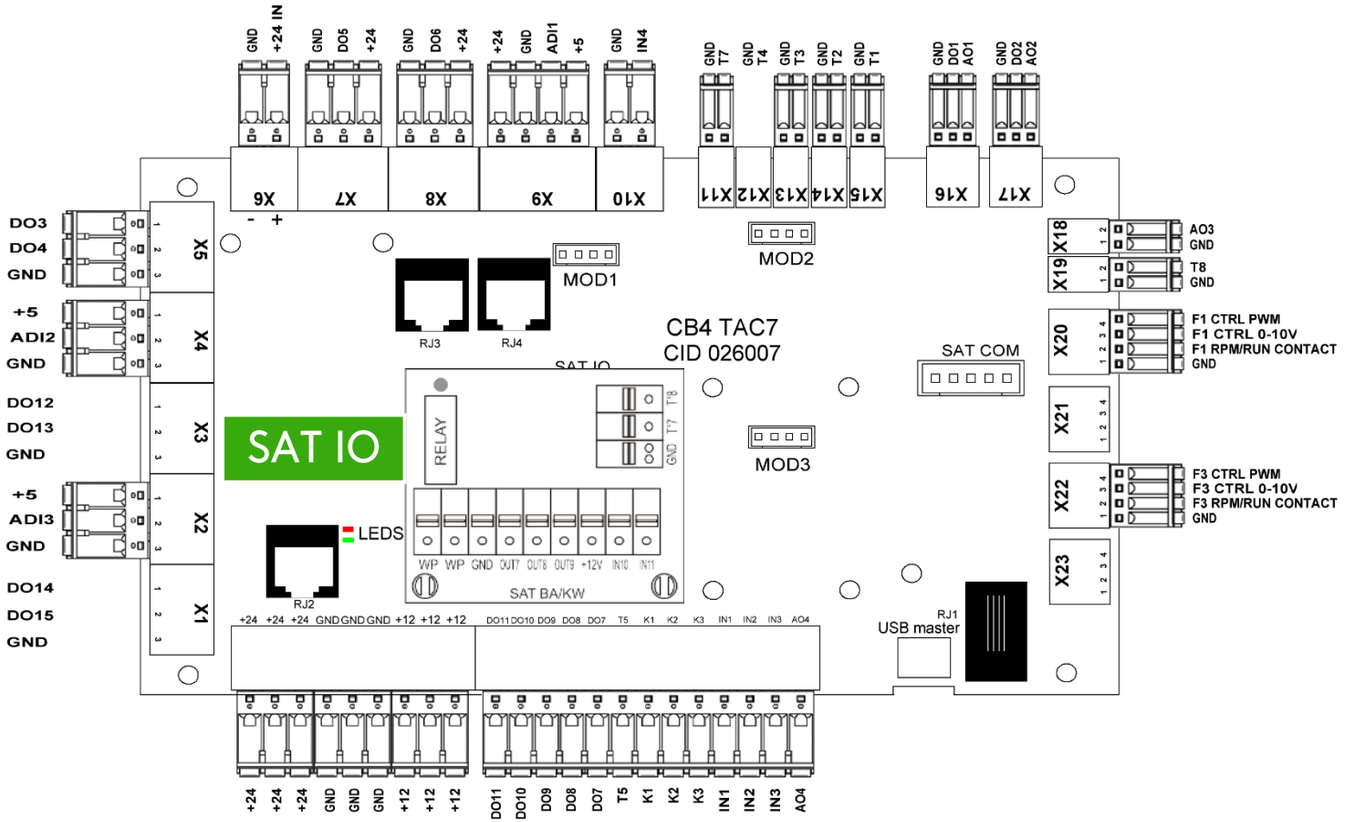


Electronic boards contains ESD sensitive components.
Wear antistatic wrist strap connected to protective earth before to manipulate them.
In alternative, discharge by touching the unit, handle boards at corners only and use antistatic gloves.

SAT RELAY OR1 – relay SPDT (COM + NC/NO) – max 0,5A 30V AC/DC
SAT RELAY OR2 – relay SPDT (COM + NC/NO) – max 0,5A 30V AC/DC

Satellite boards

- **SAT IO**



Electronic boards contains ESD sensitive components.
Wear antistatic wrist strap connected to protective earth before to manipulate them.
In alternative, discharge by touching the unit, handle boards at corners only and use antistatic gloves.

Satellite boards

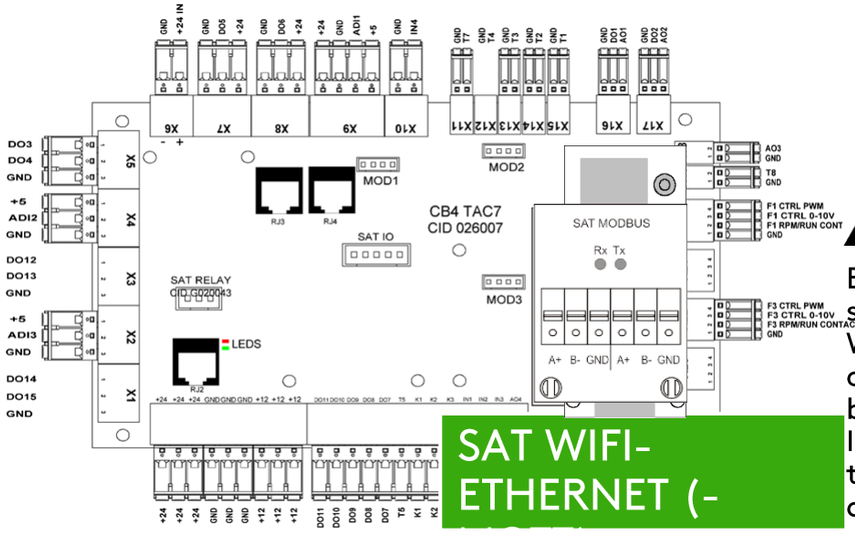
- **SAT IO**

The SAT IO is a satellite circuit designed to be fitted on the TAC7 control board and permits to extend the number of inputs and outputs.

I/O	Type	Function when closed
IN5	Digital input (closed when connected to +12V)	MASTER SELECTION: if closed, the contacts K1-K2-K3 are master respect to TACtouch, for the fans speed selection.
IN6	Digital input (closed when connected to +12V)	Comfort Mode selection: - Open: heating ON/ cooling OFF. - Closed: heating OFF/ cooling ON.
OR3-OR3	Digital output relay	Indication of the BYPASS STATUS (contact open: bypass is inactive; contact closed: bypass active). (max 30VDC/42VAC – 2A DC/2.8A AC)
AO5	Analogue output	0-10 V signal on analogue outputs linked to actual airflow and/or pressure (max 10 mA).
AO6	Analogue output	0-10 V signal on analogue outputs linked to actual airflow and/or pressure (max 10 mA).
OUT9	Digital output	Future use
IN7	Analogue Input (Closed when connected to GND)	SUPPLY RUN IN FIRE ALARM (open)
IN8	Analogue Input (Closed	EXHAUST RUN IN FIRE ALARM (open)

Satellite boards

- **Communication boards**



Electronic boards contains ESD sensitive components.
Wear antistatic wrist strap connected to protective earth before to manipulate them.
In alternative, discharge by touching the unit, handle boards at corners only and use antistatic gloves.

TAC7

Satellite boards

Communication boards

There can be only **ONE** communication board used at a time:

- SAT MODBUS:
  - Enables communication in Modbus RTU
  - One incoming port and one outgoing port, with galvanic insulation.
  - Each port has A+,B- (RS-485 half-duplex differential communication signals) and GND connector (shield of cable)
  - 2 jumpers for RS-485 line termination (by default placed for termination)
- SAT KNX:
  - Enables KNX Communication
  - One incoming port and one outgoing port
  - Each port has the + and – connectors for KNX
  - Programming led and button
- SAT WIFI - ETHERNET :
  - Enables Wi-Fi and Ethernet Communication: in an existing network or directly with a PC
  - RJ45 connector for Ethernet cable connection
- SAT WIFI - ETHERNET - MQTT:
  - Same as SAT WIFI – ETHERNET and allows in addition access to Cloud

Fans Speed Controls type and their Priority

The Air Handling Unit can be controlled by different kind of process that can't work simultaneously. There is always only one active control. A control will be active if there is not another one with a higher priority that is already active. Here are the controls priorities (1 is the highest priority).

- **Description :**

  Controls priorities (1 is the highest priority):

  1. Fire Alarm (will override also Antifrost/Defrost airflow reduction and postventilation)
  2. Fatal Alarm: alarms stopping the fans
  3. Defrost DX (will override also Antifrost airflow reduction)
  4. Boost (will not override Antifrost/Defrost airflow reduction)
  5. K1-K2-K3 (if parameter "Contacts K1-K2-K3 Master" is set to "yes", which is the case by default)
  6. Network/Advanced time schedule
  7. TACtouch (if parameter "Contacts K1-K2-K3 Master" is set to "no", to modify in section Guides/Commissioning/Commissioning settings, see Interface-TACtouch description)

Overview Heat/Cool/Bypass of Heat Exchanger

- Modulation of heating/cooling power to reach desired comfort temperature set point and measured on sensor defined Functions/Temperature/Regulation mode (Supply temperature by default, can be also the extract air temperature, TACtouch temperature, external temperature sensor).
- reheating with electrical coil, with waterborne reheater or with heat pump, with cascade possibility.
- recooling with cold waterborne cooler or chiller.
- Combi-coil; heat pump-chiller or separated heating and cooling batteries
- Interaction between reheating and cooling when both are present:
  - Automatic changeover. Only 1 setpoint for heating/cooling/freecooling: COMFORT temperature setpoint
  - Manual changeover.
    - 3 setpoints that may differ for heating/cooling/freecooling.
    - Selection of heating/cooling: via contact, communication or HMI.
- Bypass activation: don't require the presence of heating and/or cooling battery. If cooler present, interacts with it in the following way, outside freecooling specific function and related conditions (see dedicated section) :
  - Condition for bypass activation: in cool comfort mode and fresh air temperature (measured on T1 sensor) < extract air temperature (measured on sensor T2) – 1°C (default)
  - Condition for bypass deactivation while active: not in cool comfort mode or fresh air temperature (measured on T1 sensor) > extract air temperature (measured on sensor T2) + 1°C (default)
  - When the condition for bypass activation are met, cooling, if battery present, will be active only after that the bypass is full active. So cooling is disabled if the bypass is partially activated.

Overview Heat/Cool/Bypass of Heat Exchanger

- temperature regulation based on T5 (default): measurement of the actual temperature in the supply duct (T5). At least 1 or 1,5 m after the unit (if internal battery) or the external battery.
- temperature regulation based on T2/TACtouch temperature/measurement sensor n°4 (changed in Functions/Temperature/Regulation mode): measurement of the actual temperature on extract temperature sensor (T2), or on TACtouch sensor or on measurement sensor n°4. In these cases, the Regulation speed can be lowered if the system at site requires it. Also, the supply temperature will be limited between the minimum and maximum in order to avoid to blow too warm or too cold air. These limits are configurable in section Functions/Temperature/Regulation mode.
- Forced heating/cooling power off: by HMI/communication or contacts.
- Heating automatically disabled if the fans are OFF or if bypass active.
- Postventilation with configurable time (forced to min 90 seconds). Forced ON with electrical heater (pre or reheater)
- Indication output contact for Heat and for Cool

Overview Heat/Cool/Bypass of Heat Exchanger

- reheating/cooling with waterborne coil:
  - Regulation of the opening of a 3 ways valve to reduce the gap between setpoint and actual value. The speed of the regulation is configurable. At fans start-up, before that fan status is ON, the valve is commanded at 50% opening, if in heat mode.
  - Circulator pump activation contact
  - Antifrost protection of the coil through the opening of the valve when the temperature on the coil is below a threshold.
  - Generated alarms: Type 10 - Alarm indicating waterborne coils anti-frosting alert
- reheating with electrical battery:
  - Regulation of the power sent to the battery through the command of solid-state relay with PWM signal (configurable period) or 0-10V controlled module. The regulation is a PID type one, and the parameters gain, time derivative and time integrative are configurable.
- reheating/cooling with Heat Pump/Chiller:
  - Regulation of the power sent to reheating/cooling with Heat Pump/Chiller through modulation of 0-10V output signal.
  - Enabling output contact.
  - Defrost input contact. In case of Defrost, fans will run at dedicated low/reduced speed unless an electrical reheater is present, in that case, it will be activated for the duration of the defrost of the Heat pump.
- Generated alarms: Type 8 - Alarm indicating a temperature sensor T1/T2/T3 failure, Type 9 - Alarm indicating failure on temperature sensor T7, Type 18 - Alarm indicating that the comfort temperature is too low relative to set point temperature (only reheating), Type 20 - Alarm indicating that the comfort temperature is too high relative to set point temperature (only recooling), Type 19 - Alarm indicating that the comfort temperature is too low in absolute

Interface

TAC7 user-friendliness is assured through a range of interfaces

- **Features:**
  - **Different types of interface:**
    - Electrical contact interface (COM4)
    - Remote control: TACtouch
    - TACsimulator V2 software for windows 10 OS with adapter cable USB –RS485
    - Existing commercial KNX interface for units with SAT KNX

Interface

- **TACtouch:**
  - **Description:**
    - 4.3” touchscreen display used when there is a need for a graphical HMI, with a 1,5 meter long cable for connection to the air handling unit's control circuit board. The TACtouch touchscreen is a complete graphic monitoring system where the screens are designed to be intuitive and complete, ensuring a user friendly experience.
    - If the hand-held terminal is not used for 5 minutes, it switches over to the sleep mode.
    - The Touchscreen controller can be used outdoors, but it must be kept at a weatherproof place.

- Display: 4,3” Graphic, color 480x272 pix. with touch screen
- Operating temperature: 0… + 50°C
- Supply power 5..24 VDC - from the TAC7
- controller socket
- Protection class: IP20
- Dimensions [mm]: 144x97x20
- Power consumption: 1,8 VA

Caution!

Screens appearance may slightly differ from the one on physical TACtouch

TAC7

- Generated alarms: Alarm Type 1 - Alarm indicating a communication breakdown

Interface

- **TACtouch:**
  - **Operation:**

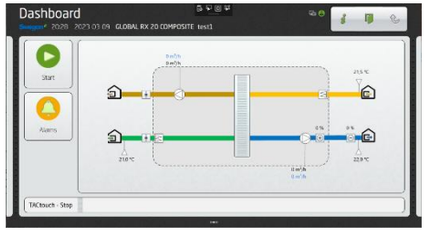
Start-up image

User selection:
Select user according to allowed access level, which are, from lowest to highest: local, installer, service.

Then enter the associated 4 digits PIN code

Functions screen:
Select desired functions to configure or to monitor status

During commissioning, go to commissioning menu. Set date and time then also parameter for master selection “contacts K1-K2-K3 master”: set no only if the
AHU is to be controlled with TACtouch control screen rather than with electrical contacts.



Dashboard

Interface

- **TACtouch:**
  - **Header:**

Contains Information common to almost all screens, from left to right :
- Date and time returned by the control board
- Specific name of the Air Handling Unit: If set in Functions/Air Handling Unit/Name (see “Functions” section). Useful to distinguish between eventual multiple air handling unit on the same site, may be set during commission.
- Status of communication with the control board: ok ; not ok:

- Selected user: local ; installer ; service ; offline

- Button information : display contextual and detailed information related to the current screen

- Button Logout /Home : depending on the context, the button will allow to logout and switch to user selection screen, Or to go the Dashboard

- Button Back : allows to go back to previous screen

Interface

- **TACtouch:**
  - **Dashboard:**

General
The dashboard is displayed until another screen is selected.

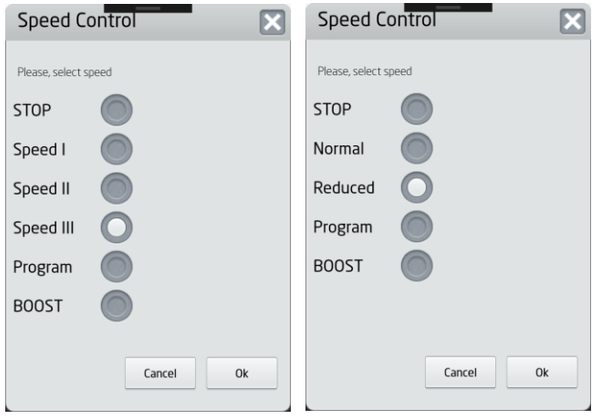
The content in the flow chart changes depending on the selected type of air handling unit and other functions that affect the relevant operating conditions.

Changing the operating mode
Start and stop of the air handling unit and change over to manual or automatic operation can be done from the dashboard.

Interface

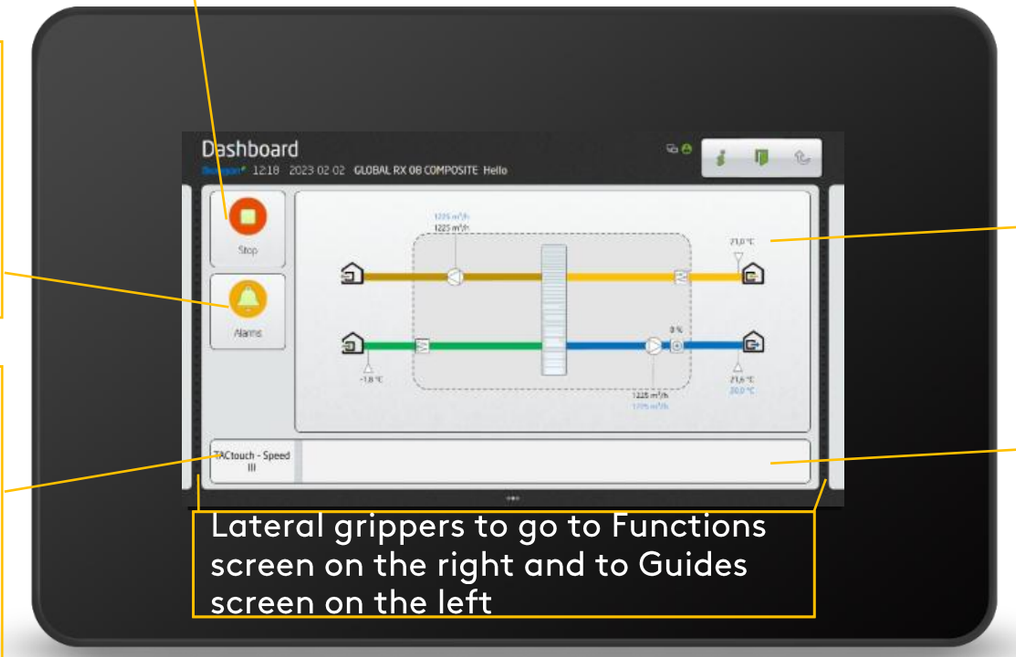
- **TACtouch:**
  - **Dashboard:**

Start/Stop button: possibility to start the unit at desired speed level or to stop it. Speed levels are low, medium and high for Constant airflow or torque regulation mode, while for demand control and Constant pressure, the 2 available levels are “Normal” and “reduced” where sleep factor is applied (see Speed Control screen here beside).
The button allows also to start the unit in BOOST mode or automatic mode provided that time schedules have been previously configured in section Functions/ Time and Schedule/Day schedule.
Button is greyed if the air handling unit is not controlled by the TACtouch (see indication of current controller here below)



Speed Control in Constant airflow/torque airflow regulation mode on the left side, in demand control/constant Pressure on the right

Buttons Alarm: quantities of fatal alarms and medium/low level ones appear in 2 dedicated circles, red and blue respectively.
The Alarm screen appears by pressing the button (see dedicated section)



Lateral grippers to go to Functions screen on the right and to Guides screen on the left

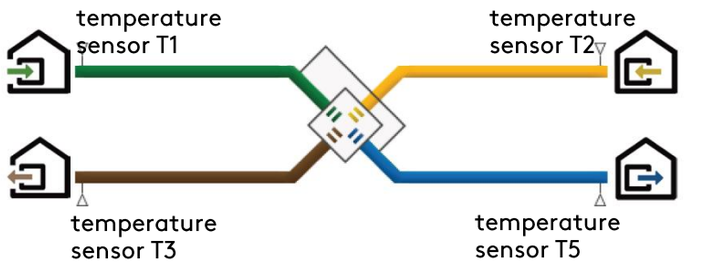
Flow chart: it is not editable by the user, the appearance of the image varies depending on the type of air handling and its configured options

Control status: Indicates what is controlling speed: electrical contacts K1-K2/K3 (default), TACtouch, automatic (time scheduler), Communication (Modbus, BACnet, KNX), BOOST, freecooling, alarm, fire alarm. See “Controls and Priority” priority section for interaction between each of these control modes.

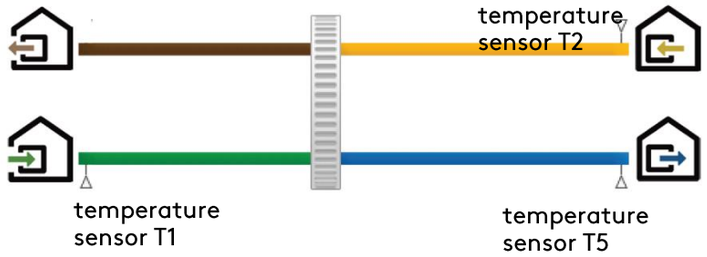
Process Status: Indication about eventual additional running processes like heating, cooling, freecooling, postventilation, antifreeze.

Interface

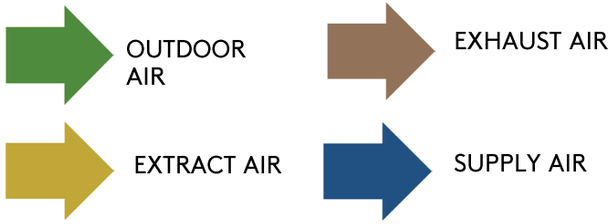
Plate heat exchanger



Rotary heat exchanger



For each temperature sensors, excepted T3, current temperature in °C is indicated in black text color, setpoint, but only for the reference comfort temperature (T5 or T2) in blue



Fan: current airflow and unit(m³/h, l/s or %) is indicated in black text color, setpoint (m³/h, l/s, % or Pa) and unit in blue

Filter

Bypass closed

Bypass open

Motorized damper (open/closed/opening)

Electrical heating coil

Waterborne heater/Heat pump

Waterborne cooler/Chiller

Waterborne reversible combicoil/Heat pump & chiller

N.B.: below each battery is indicated the current % of power output to it. The relative position of the battery is indicated in its wiring diagram

TAC7

Interface

- **TACtouch:**

Guides:

Main Setup

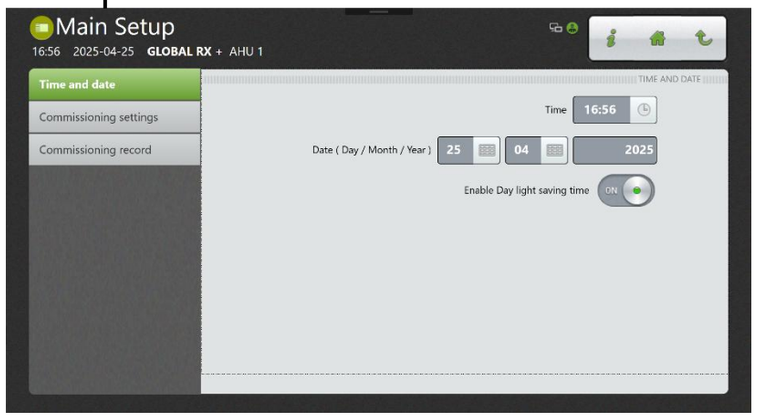
Parameters to set during the commissioning of the Air Handling Unit.
At the end of the commissioning, it is highly recommended to save the parameters using button "Save Data".

Time and date
Set the time and date.

Commissioning settings
- Language: Display language TACtouch.
- Air flow unit: m³/h, l/s
- Damper: Select YES if there is a damper at the air inlet. This function will activate the start-up delay.
- 3 months: Activate a preventive maintenance message every 3 months.
Hours for the limit associated to this maintenance corresponds to 3 months. Once the hours counter associated to this maintenance has exceeded the hours limit, a notification is generated. The hours when the unit is stopped are also counted.
The instructions in the maintenance manual of the unit for the 3 months maintenance should be followed. Mainly, the filters should be cleaned or replaced.
- Contacts K1-K2-K3 Master: Set this parameter to control the unit with electrical contacts K1-K2-K3 instead of the speed selection buttons of the control screen.
- Save Data: save parameters and status variables to external memory if present on CSV file named "DataSaved", eventually overwritten. It is advised to archive this file and rename it with the serial number of the air handling unit.

N.B.: Other settings available for airflow regulation can be found in Functions section.

For more detailed information, see the relevant function below.



TAC7

Interface

- **TACtouch:**

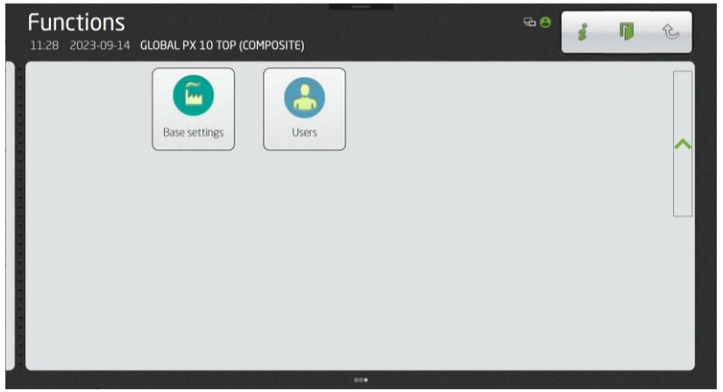
Functions:

Functions screen:

Select desired functions to configure or to monitor status.

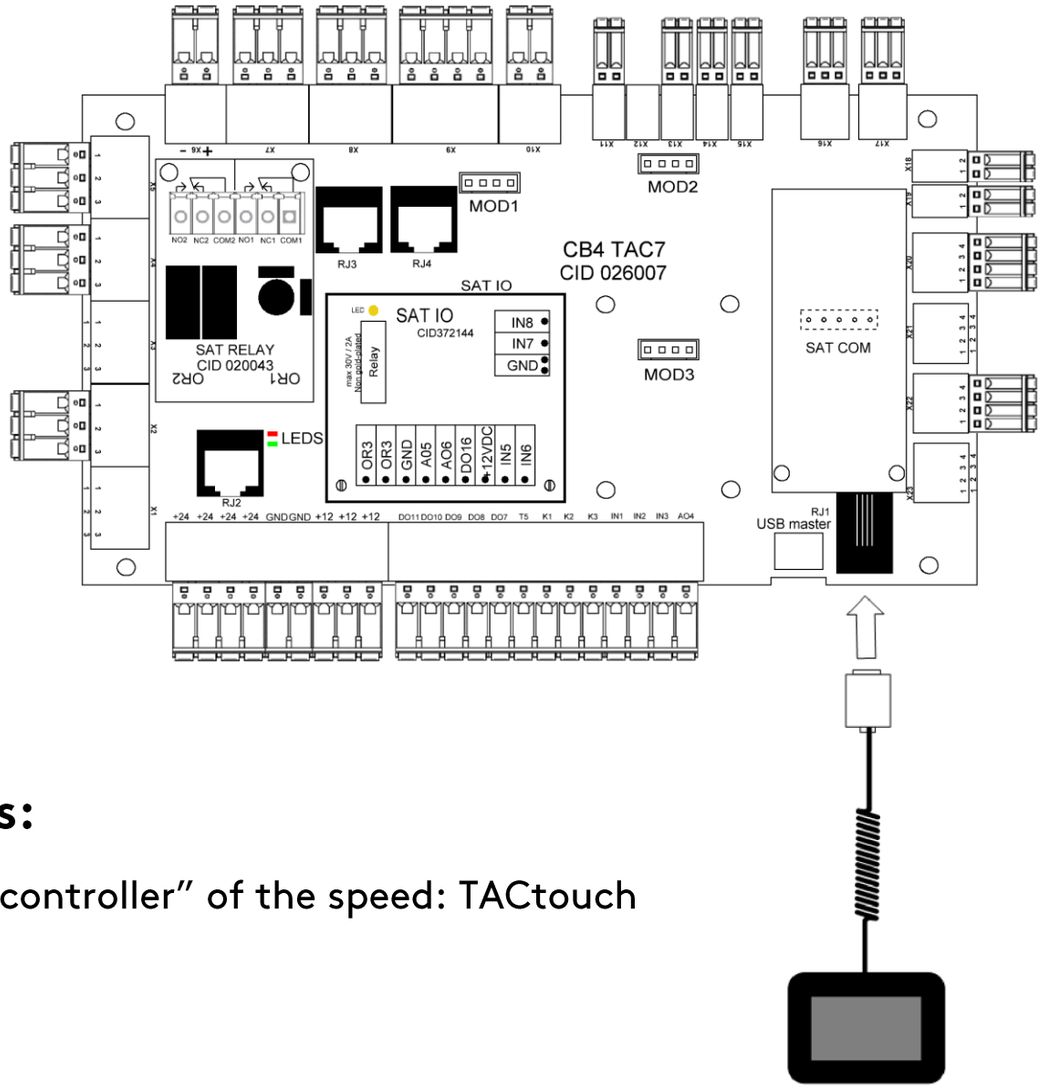
N.B.: some functions are available only for installer or service levels. For service level, the corresponding icon will be present: , then the section can be skipped for normal operations or commissioning.

See detailed description for each function in dedicated section



Interface

- **TACtouch:**
  - **Wiring:**



  - **Associated information status:**

Dashboard/Indication about the current “controller” of the speed: TACtouch

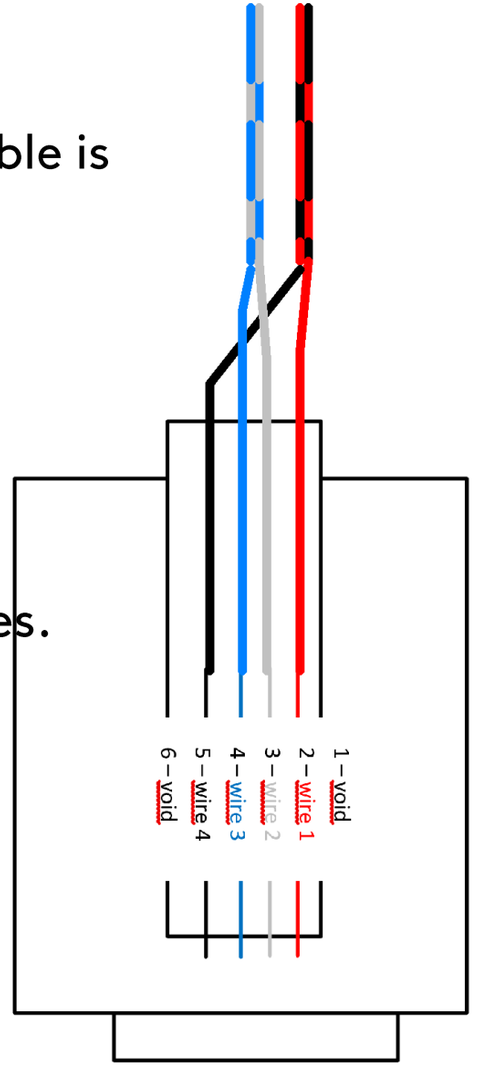
TAC7

Interface

- **TACtouch:**
  - **Cable specification:**

Use delivered cable, or in alternative, In installation where an extender cable is necessary,
a cable respecting theses specifications:

- conform to the RS-485 Standard with twisted pair conductors.
- shielded.
- conductor Area min 0.2 mm².
- the total length must not exceed 100 meters.
- maximum DC resistance on single wire: 8 Ohms
- straight wired, 2 pairs connected to RJ12 connectors at cable extremities.
- 1 pair to the middle pins, the other pair to the extremity pins.
- Pinout for each extremity connector as in figure below
- (colors are indicative for the wires of the extender cable):



Interface

- **TACtouch**
  - **Software Update:**
    - Possibility to update the control panel software via memory card micro SDHC inserted in the ɪt in the panel interface.

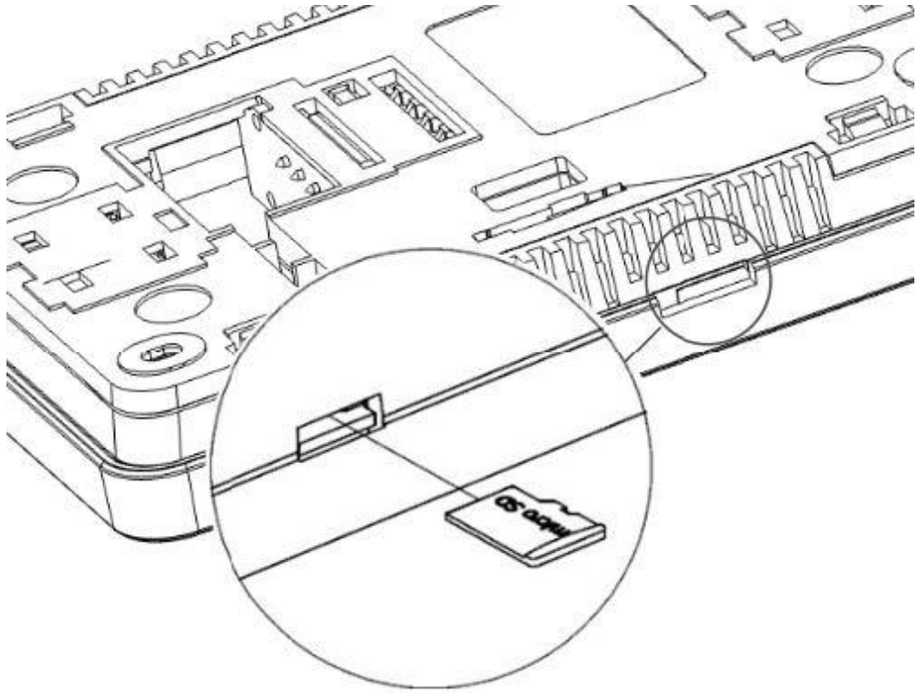
Caution!

Only microSD HC type memory cards should be used (FAT32 format, max. 32 GB).

- Software and story version available online:

https://www.swegon.com/support/software/tac-control/tac-update/

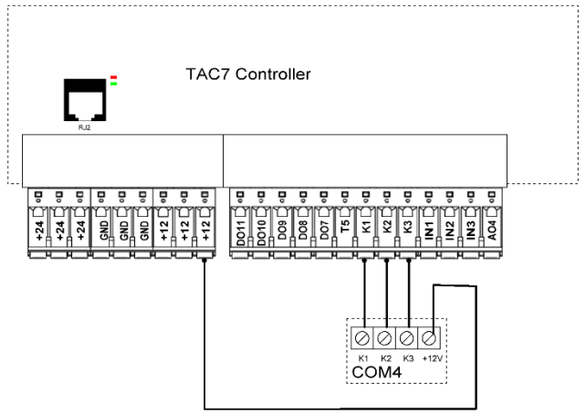
However, it is recommended to download the last installation package of TACsimulatorV2, which contains last TAC7 and TACtouch firmware. Then the function “Software” allows an easy way to download the software to the control board.



TAC7

Interface

- **COM4:**
  - **Description:**
    - Action on K1-K2-K3 contact.
    - Together with the other digital and analogue I/O, the unit can be fully controlled and monitored (see I/O section for more details)
    - Available on all units
  - **Wiring:**



  - **Associated information status**

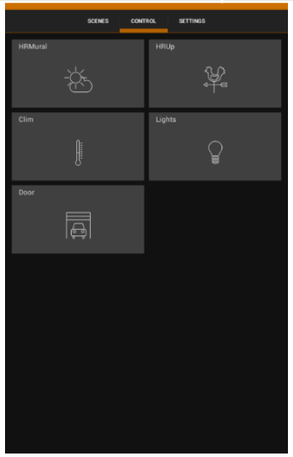
Status	Value	Description	Condition
Controlled by	K1-K2-K3		when Master Selection for fan speed is “Contacts K1/K2/K3”

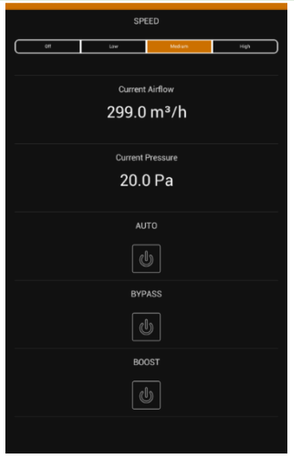
Interface

- **KNX interfaces:**
  - **Description:**
    - Total control of the unit through one or more commercial KNX device or through commercial apps
    - Need SAT-KNX extra board
    - Not possible to configure the unit
  - **Associated information status:**

Status	Value	Description	Condition
Controlled by	KNX		when Master Selection for fan speed is not “Contacts K1/K2/K3”

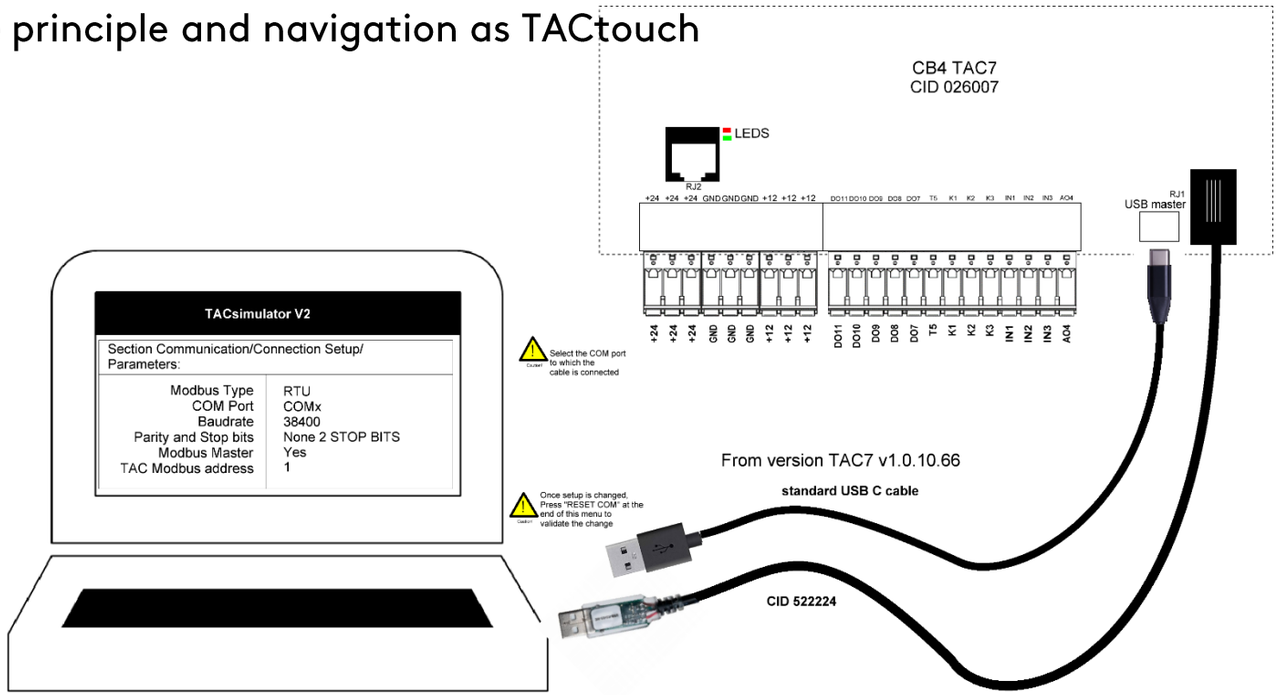
TAC7





Interface

- **Software – TACsimulator V2:**
  - **Description:**
    - Total control and configuration of the unit (under Windows 7-8-10-11).
    - Need USB RS 485 cable adapter (CID 522224). In alternative, can be used with SAT-Ethernet or SAT WIFI extra board. Finally, from version 1.0.10.66, a standard USB C is enough.
    - Same principle and navigation as TACtouch



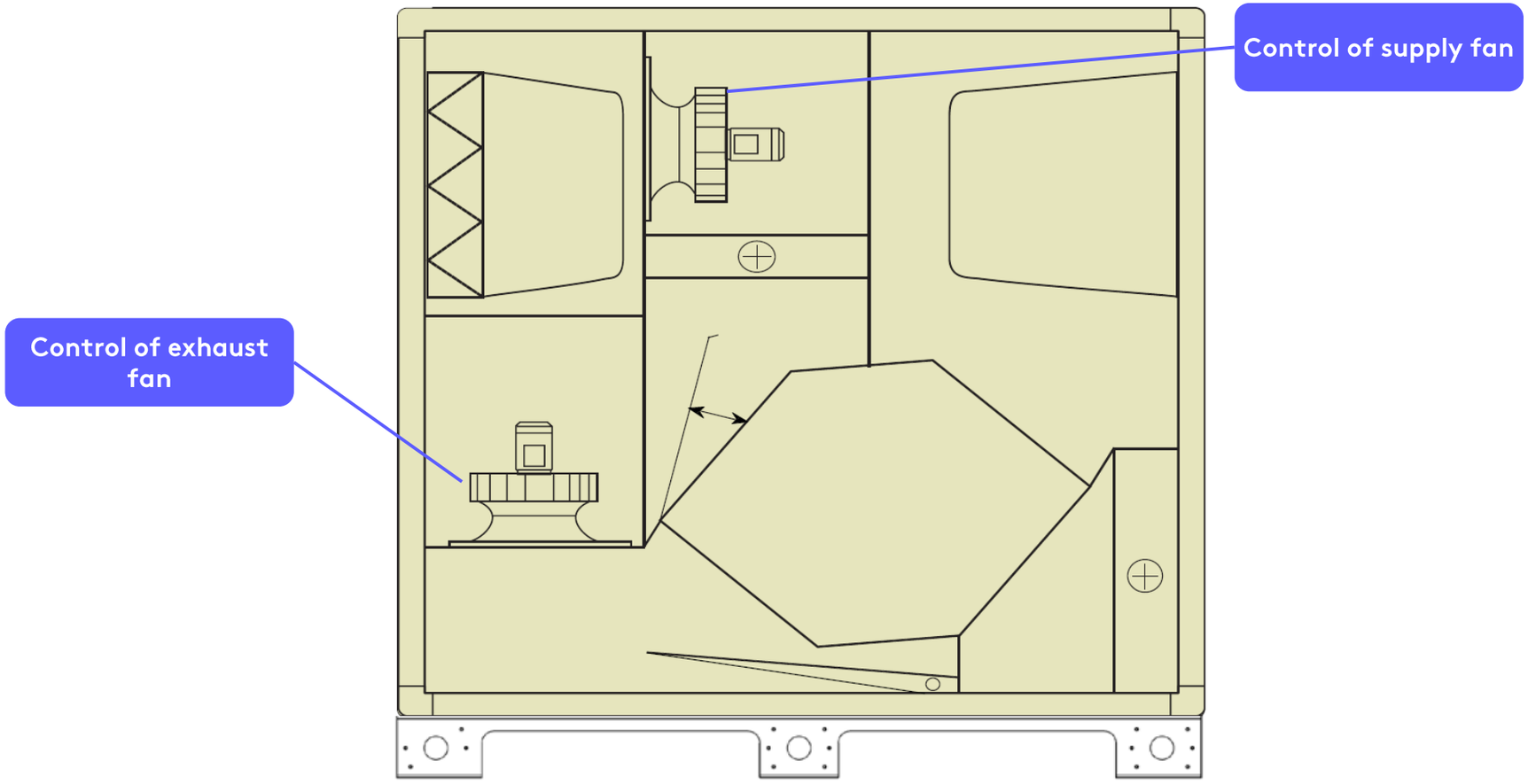
TAC7

Functions/Air flow

Air flow

Functions/Air flow:

Working point control, with or without external sensors, through control of the motor's torque and the rotation speed



TAC7

Functions/Air flow

Status

Status - Air Quality sensors

Operation Level

Functions/Air flow/Status:

All the relevant values can be read here. Used for performance Checks

Status - Air Quality sensors

N.B.: this section appears only if air quality sensors have been configured, either to be used in demand control air low regulation mode, or for boost function see below)

Current values read by configured air quality sensors.

Operation Level

Settings depend on the chosen mode for Air flow regulation.

See detailed description for each regulation mode in their specific sections:

- Functions/Air flow - Constant Air flow mode.

- Functions/Air flow – Demand Control mode.

- Functions/Air flow - Constant Pressure mode.

Functions/Air flow

Fan with backward curved blades

- **TACtouch:**

Fan with backward curved blades

Specific settings for fans like K-factor and presence of pressure sensor at fan inlet for the determination of the actual air flow.

- Constant Air Flow Sensor: Select YES if a pressure sensor is fitted on the fans inlets.

These sensors constitute the CA kit option that allows the use of constant airflow mode and to modulate the airflow instead of the fan torque in LS and CPs mode.

- ***This kit consists in one pressure sensor placed at the inlet of each fan.***
- ***Generated alarms: if the pressure sensor is a Modbus/COM one, Type 21: Alarm indicating communication error for one of the Modbus pressure sensor***
- ***Wiring: Modbus for slave devices in Fieldbus section***

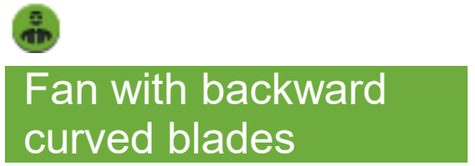
- Sensor for "Constant Air Flow": Type of pressure sensor used in "Constant Air Flow" mode. Select 0-10V if it is a sensor with analogue output, otherwise select Modbus if it is a sensor with Modbus communication

- Advanced settings for pressure sensors of kit CA: Advanced configuration of pressure sensors allowing modifications of settings respect to defaults

Functions/Air flow

- **TACtouch:**

Fan with backward curved blades



- K-Factor Supply air: Enter the Supply air K-Factor:
- K-Factor Exhaust air: Enter the Exhaust air K-Factor

K factor allows to compute the airflow based on pressure at fan inlet using formula $Q = k.\sqrt{dP}$

Where

Q: airflow [m^3/h]

dP: pressure variation at fan inlet [Pa]

k: characteristic constant k factor of the fan type in use

Functions/Air flow

Regulation Mode

- Regulation Mode: Air flow regulation mode with 3 possibilities:

1 - Constant Airflow (CA)

2 - Demand Control / Link to Signal (LS)

3 - Constant Pressure (CP)

Regulation Mode

Units

- Air flow unit: m³/h, l/s

Units

BOOST

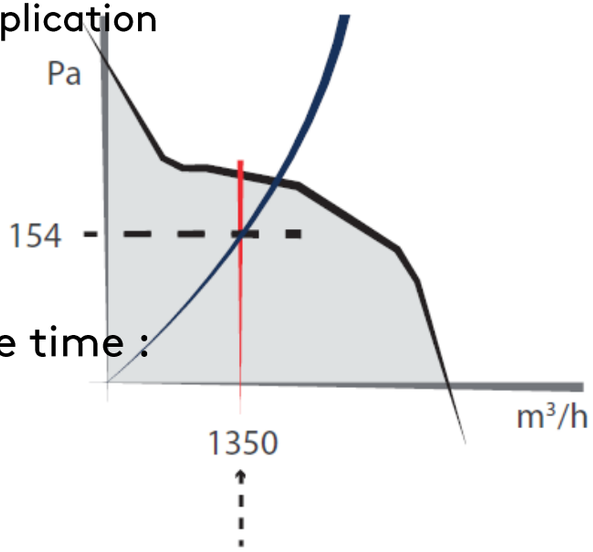
This feature forces the supply and exhaust airflows to configurable values with a greater priority respect to the normal working mode. Activated by contact, TACtouch/Communication or air quality sensor (0-10V analogue/Modbus).

See detailed description in Section « BOOST»

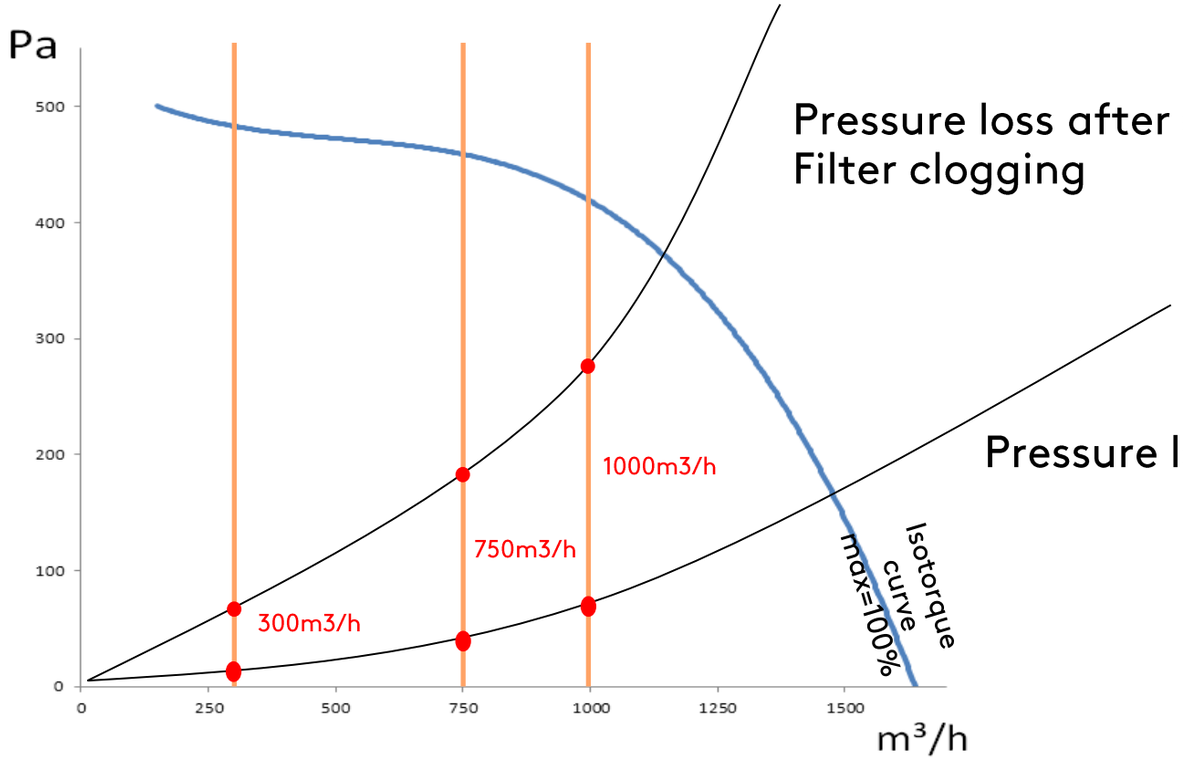
BOOST

Functions/Air flow - Constant Air flow mode

- **Description:**
  - No pressure sensors needed for forward fans
  - 3 airflows selection : selection of the exact airflows needed for the application
  - Computed pressure alarm available (only for GLOBAL)



Pressure loss after some time :
Filter clogging



Pressure loss at installation

TAC7

Functions/Air flow - Constant Air flow mode

- **Setup:**

Function Air flow /Regulation Mode

- Regulation Mode: **Select Constant air flow.**

Regulation Mode

Function Air flow /Operation Level

Operation Level

Definition of the airflow/pressure levels associated to current regulation mode

- Air flow 1: Supply air flow setpoint 1 in m³/h or l/s according to configurated air flow unit. This is activated via the start/stop button in the dashboard, then selecting speed I, or by connecting K1 to + 12V.

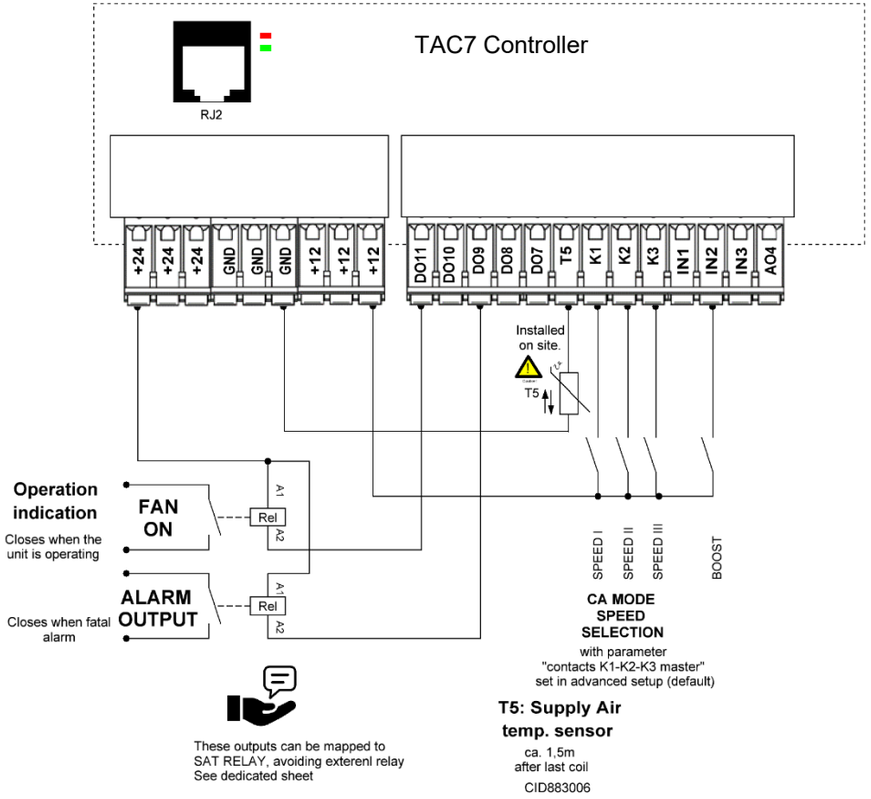
- Air flow 2: Supply air flow setpoint 2 in m³/h or l/s according to configurated air flow unit. This is activated via the start/stop button in the dashboard, then selecting speed II, or by connecting K2 to + 12V.

- Air flow 3: Supply air flow setpoint 3 in m³/h or l/s according to configurated air flow unit. This is activated via the start/stop button in the dashboard, then selecting speed III, or by connecting K3 to + 12V.

- Extract/Supply: Percentage of extract air flow compared to the supply air flow.

Functions/Air flow - Constant Air flow mode

- **Operation:**
  - **TACtouch or network: "Contacts K1/K2/K3 master" set to "NO". TACtouch position I for airflow m³/h K1, II for K2, III for K3. Button OFF for soft stop.**
  - **Wiring:**



Master Selection for fan speed is "Contacts K1/K2/K3"

⇨ controlled by TAC7/viewer

K1 closed ⇨ airflow m³/h K1 , if controlled by TAC7
K2 closed ⇨ airflow m³/h K2 , if controlled by TAC7
K3 closed ⇨ airflow m³/h K3, , if controlled by TAC7

K1/K2/K3 open ⇨ soft stop, if controlled by TAC7

TAC7

Functions/Air flow - Constant Air flow mode

- **Associated information status:**

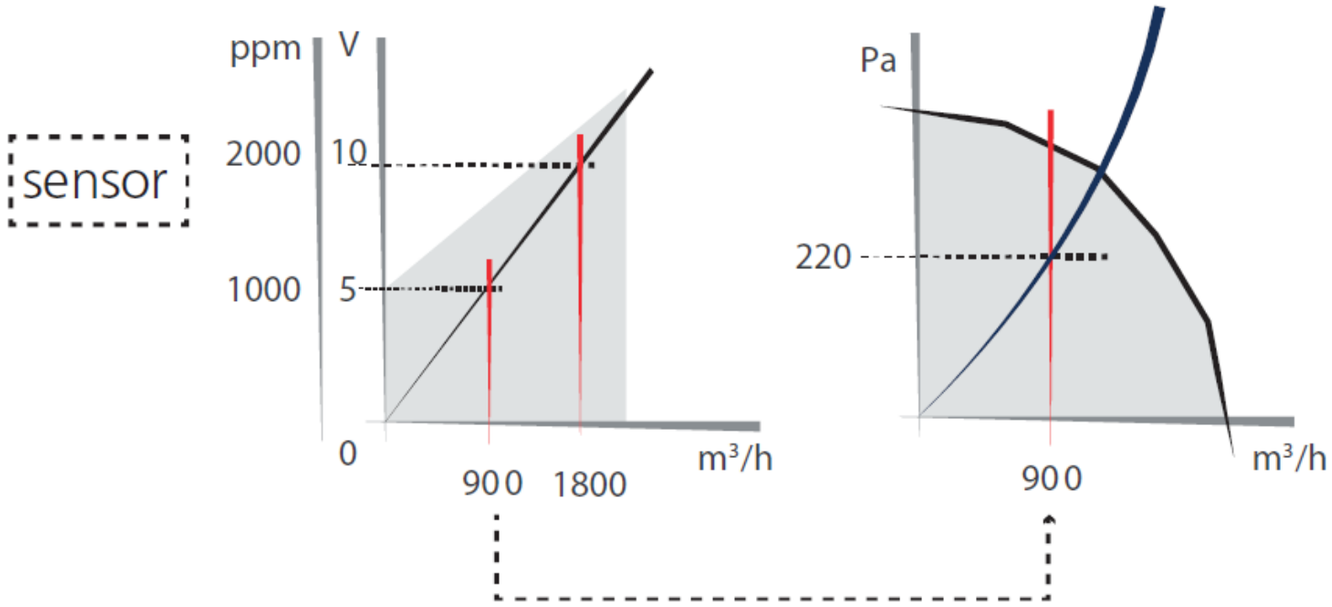
Dashboard/Indication about the current “controller” of the speed and its level: TACtouch or K1/K2/K3

Function Air Flow/Status: setpoint for supply and exhaust in m^3/h or l/s according to configurated air flow unit.

Dashboard/Flow chart: on each fan, setpoint in blue and actual airflow in black (see Function Air Flow/Status for unit).

Functions/Air flow – Demand Control mode

- **Description:**
  - Enables to link the airflow linearly to
    - a 0-10 V signal from a potentiometer or an analogue master.
    - Values output by 1, 2 or 3 air quality sensors measuring physical magnitudes like CO2, VOC, humidity.
  - Complete configuration of the relationship between airflow and signal
  - Min and max voltage threshold for fans stop
  - reduction factor on K3 or with selection of reduced speed on TACtouch.

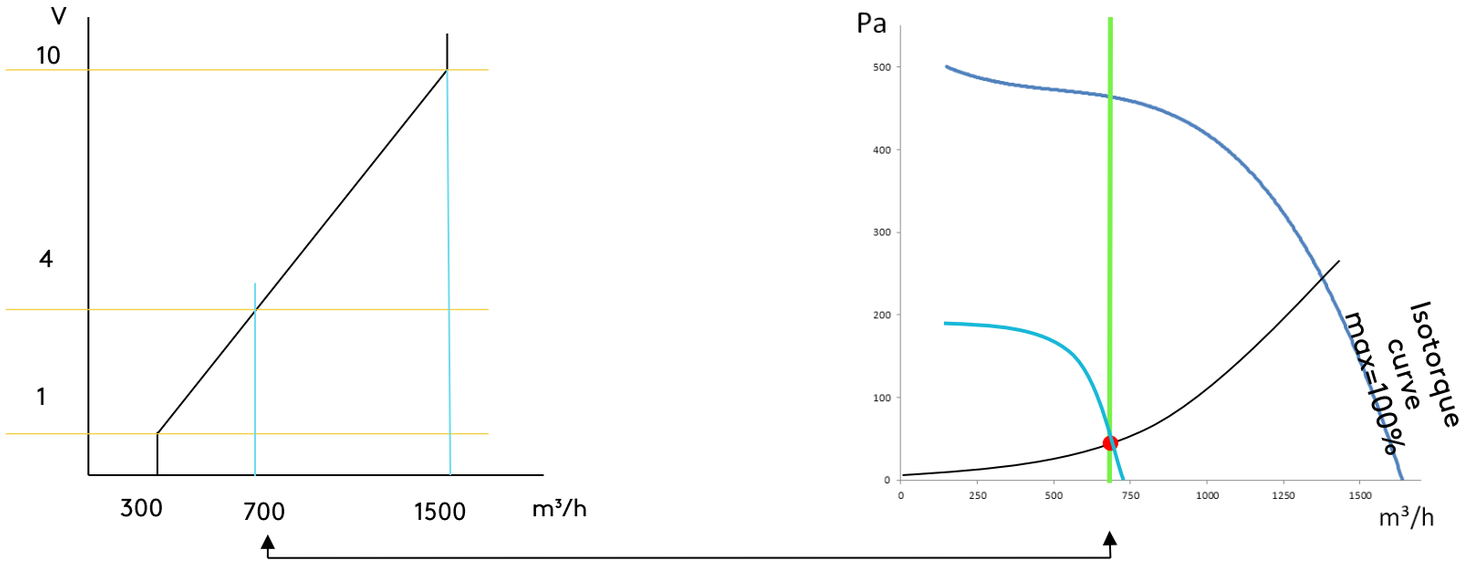


TAC7

Functions/Air flow – Demand Control mode

- **Link to signal, without sensor**

Airflow setpoint will be linearly proportional to the 0-10V signal applied to K2 input. It is possible to have 2 independent setpoints for supply and exhaust with additional signal on K3. Signal on K2 will control supply while the one K3 exhaust, using the same link.



TAC7

Functions/Air flow – Demand Control mode

- **Setup (parameter “Air Quality sensors” set to “None”):**

Regulation Mode

Operation Level

Function Air flow /Regulation Mode

- Regulation Mode: Air flow regulation mode. Select Demand Control.

Function Air flow /Operation Level

Definition of the airflow/pressure levels associated to current regulation mode

- Air Quality sensors: Selection between use of direct 0-10V signal on analogue input to do the link to airflow, or the use of air quality sensor(s)

- Vmin: Minimum voltage of the sensor connected to Analogue Input.

- Vmax: Maximum voltage of the sensor connected to Analogue Input.

- Air flow at Vmin: Air flow corresponding to Vmin.

- Air flow at Vmax: Air flow corresponding to Vmax.

- Activation of the 2nd 0-10V: Activation of the control of the supply and extract air flows by two 0-10V signals connected to K2 and K3. The signal-flow link must be the same for the extract air and the supply air.

- Extract/Supply: Percentage of extract air flow compared to the supply air flow.

- Reduction factor: Reduction factor applied to the setpoint. This is activated via the start/stop button in the dashboard, then selecting "Reduced", or by connecting K3 to + 12V.

Functions/Air flow – Demand Control mode

- **Setup (parameter “Air Quality sensors” set to “None”):**

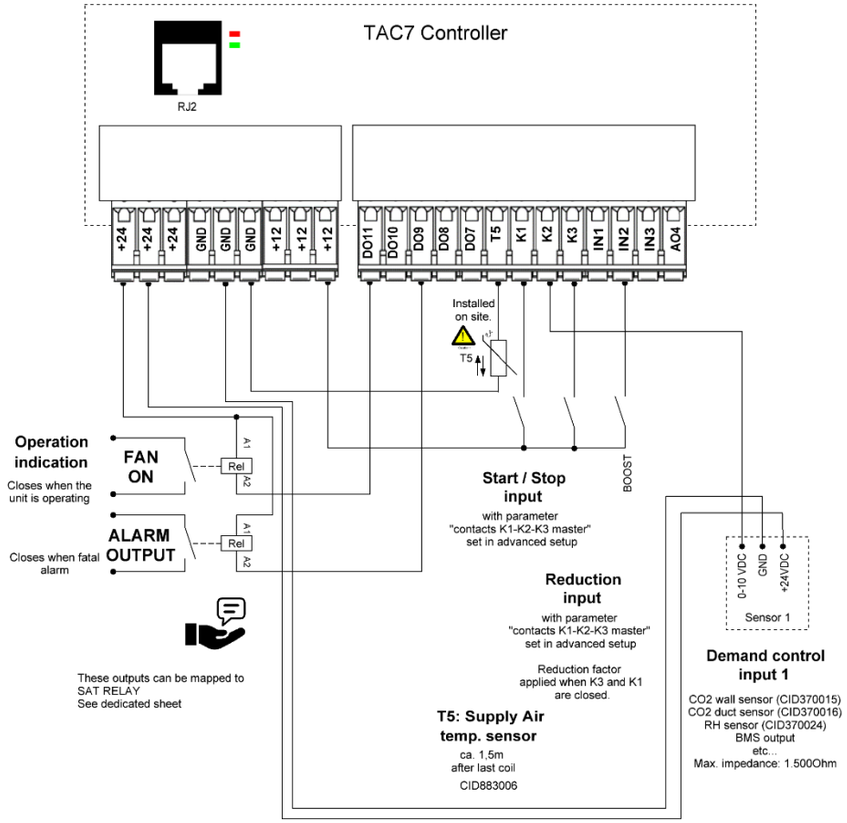
Function Air flow /Stop fans outside link limits

Stop fans outside link limits

- Fan stop 0-10V < Vlow: The fans stop if the 0-10V signal connected to K2 is lower than Vlow.
- Vlow: Value of Vlow. The fans stop if the 0-10V signal is lower than Vlow.
- Fan stop 0-10V > Vhigh: The fans stop if the 0-10V signal connected to K2 is higher than Vhigh.
- Vhigh: Value of Vhigh. The fans stop if the 0-10V signal is higher than Vhigh.

Functions/Air flow – Demand Control mode

- **Operation (parameter "Air Quality sensors" set to "None"):**
  - **TACtouch or network: "Contacts K1/K2/K3 master" set to "NO". TACtouch position "Normal" for start, "Reduced" for K3 reduction factor. Stop for soft stop.**
  - **Wiring diagrams with 1 single 0-10V signal on K2 for supply (by default):**



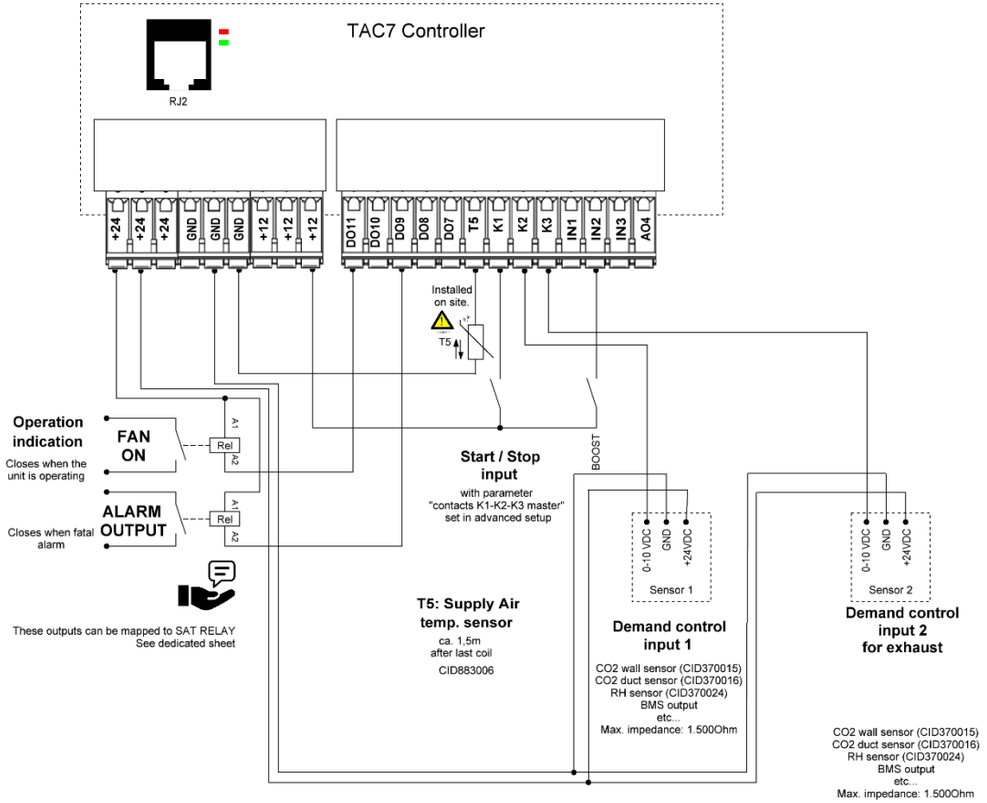
Master Selection for fan speed is "Contacts K1/K2/K3"
⇨ controlled by TAC7/viewer

K1 closed/closed ⇨ soft start/stop, if controlled by TAC7
K2 ⇨ 0-10V signal, maximum impedance allowed: 1500 Ω
K1+K3 closed/open ⇨ % on K3 activated/inactive, if controlled by TAC7

TAC7

Functions/Air flow – Demand Control mode

- **Operation (parameter "Air Quality sensors" set to "None"):**
  - **Wiring diagrams with 1 0-10V signal on K2 for supply and 1 0-10V signal on K3 for exhaust/Supply:**



Master Selection for fan speed is "Contacts K1/K2/K3"
⇨ controlled by TAC7/viewer

K1 closed/closed ⇨ soft start/stop, if controlled by TAC7
K2 ⇨ 0-10V signal, maximum impedance allowed: 1500 Ω
K3 ⇨ 0-10V signal for exhaust or 2nd signal for supply, maximum impedance allowed: 1500 Ω

TAC7

Functions/Air flow – Demand Control mode

- **Demand control, with sensors:**

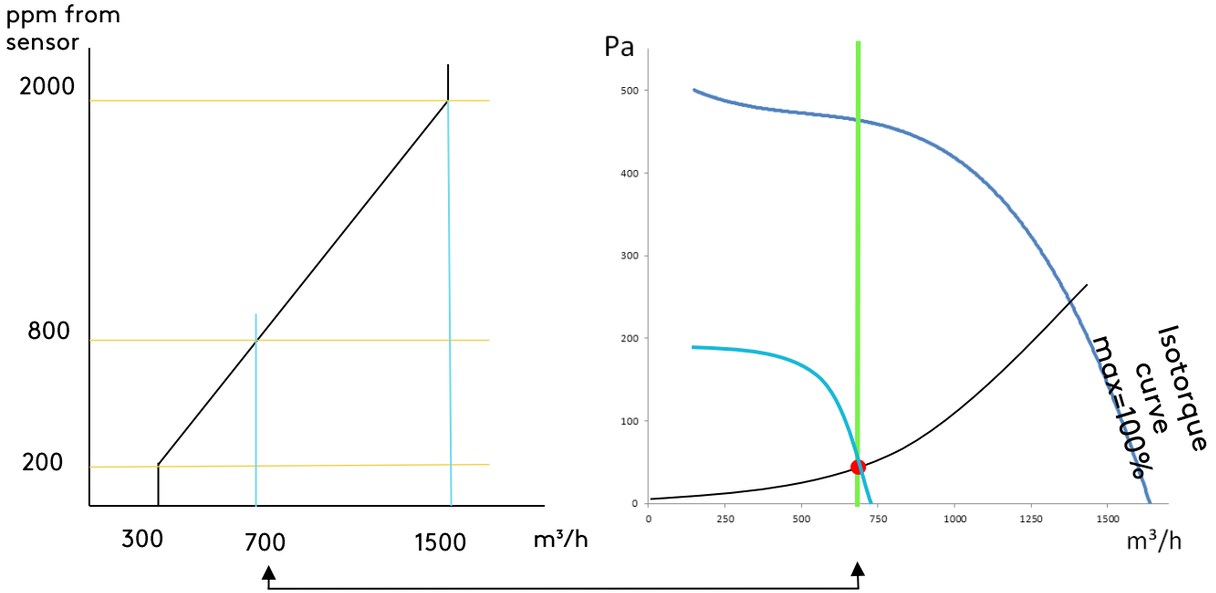
  Supply air flow setpoint will be linearly proportional to the output value of a sensor measuring levels of CO2, VOC or humidity in most of the case. It is possible to connect up to 3 sensors for this control mode with their own direct link between measured value and airflow.

  In case of multiple sensors, the resulting setpoint can be configured to be the highest (default), lowest or the medium obtained by all the sensors.

  The setpoint for exhaust will be obtained by the balancing ratio applied to the one of the supply air.

Sensors can be:

- Analogue 0-10V
- Modbus
- Serial communication (prewired/premounted/preconfigured)



Functions/Air flow – Demand Control mode

- **Setup (parameter “Air Quality sensors” set to 1, 2 or 3):**

Function Air flow /Regulation Mode

Regulation Mode

- Regulation Mode: Air flow regulation mode. Select Demand Control.

- Rule for multiple sensors: In case of more sensors in the same air flow, state how to apply and combine the sensor signals: MAX VALUE; MIN VALUE; AVERAGE OF ALL VALUES

Function Air flow /Operation Level

Operation Level

Definition of the airflow/pressure levels associated to current regulation mode

- Air Quality sensors: Selection between use of direct 0-10V signal on analogue input to do the link to airflow, or the use of air quality sensor(s)

- Extract/Supply: Percentage of extract air flow compared to the supply air flow.

- Reduction factor: Reduction factor applied to the setpoint. Reduction factor applied to the setpoint. This is activated via the start/stop button in the dashboard, then selecting "Reduced", or by connecting K3 to + 12V.

Functions/Air flow – Demand Control mode

- **Setup (parameter "Air Quality sensors set to 1, 2 or 3):**

Function Air flow / Settings - Air Quality sensors - Type

Settings - Air Quality sensors - Type

Configuration of quality sensors types: measured physical magnitude, output value as analogue voltage or data on communication bus, scale factor to obtain directly readable and converted measured value in desired physical unit.

- Measure: Measured physical magnitude by the sensor
- Type: Output value by sensor as analogue voltage or data on communication bus: Modbus or Serial
- Scale Factor: Scale factor to obtain directly readable and converted measured value from sensor in desired physical unit
- Airflow at min. level: Airflow desired at minimum level for sensor
- Airflow at max. level: Airflow desired at maximum level for sensor

Function Air flow / Settings - Air Quality sensors - Analogue

Settings - Air Quality sensors - Analogue

Configuration of the analogue input used for the sensors and of the linear link between their output voltages and corresponding scaled values of physical measured magnitude

- I/O: Selection of analogue input used for the sensor.
- Vmin: Minimum voltage of the sensor connected to Analogue Input.
- Vmax: Maximum voltage of the sensor connected to Analogue Input.
- Min. Level: Minimum level that the sensor can output.
- Max. Level: Maximum level that the sensor can output.

Functions/Air flow – Demand Control mode

- **Setup (parameter "Air Quality sensors set to 1, 2 or 3):**

Function Air flow / Settings - Air Quality sensors - Modbus/Serial

Settings - Air Quality sensors - Analogue

Configuration of the bus to which the sensor is connected to, the scaled measurement range, and for Modbus sensors, their address as well their Modbus register type and number used

- Bus: Bus on which the sensor is connected to. Used for Modbus/serial sensor type.
- Address: Address of the sensor. Used for Modbus type
- Register: Modbus register number to access of the sensor. Used for Modbus type
- Min. Level: Minimum level that the sensor can output.
- Max. Level: Maximum level that the sensor can output.

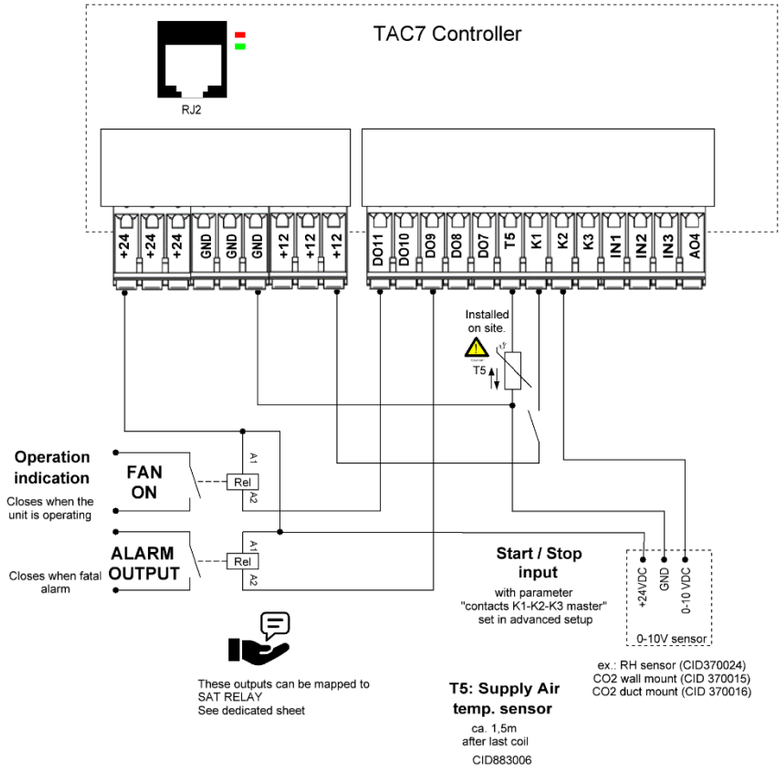
Function Air flow /Stop fans outside link limits

Stop fans outside link limits

- Minimum level for fans stop: Minimum value of measured signal under which the fans may be stopped. Disabled with 0. If multiple sensors are assigned to a flow, all of them must have their measurement under their limit to stop.
- Maximum level for fans stop: Maximum value of measured signal above which the fans may be stopped stop. Disabled with 0. If multiple sensors are assigned to a flow, all of them must have their measurement above their limit to stop.

Functions/Air flow – Demand Control mode

- **Operation (parameter "Air Quality sensors" set to 1, 2 or 3):**
  - **TACtouch or network: "Contacts K1/K2/K3 master" set to "NO". TACtouch position "Normal" for start, "Reduced" for K3 reduction factor. Stop for soft stop.**
  - **Wiring diagrams with 1 0-10V analogue sensor on K2 for supply:**



Master Selection for fan speed is "Contacts K1/K2/K3"
⇨ controlled by TAC7/viewer

K1 closed/closed ⇨ soft start/stop, if controlled by TAC7
K2 ⇨ 0-10V signal, maximum impedance allowed: 1500 Ω
K1+K3 closed/open ⇨ % on K3 activated/inactive, if controlled by TAC7

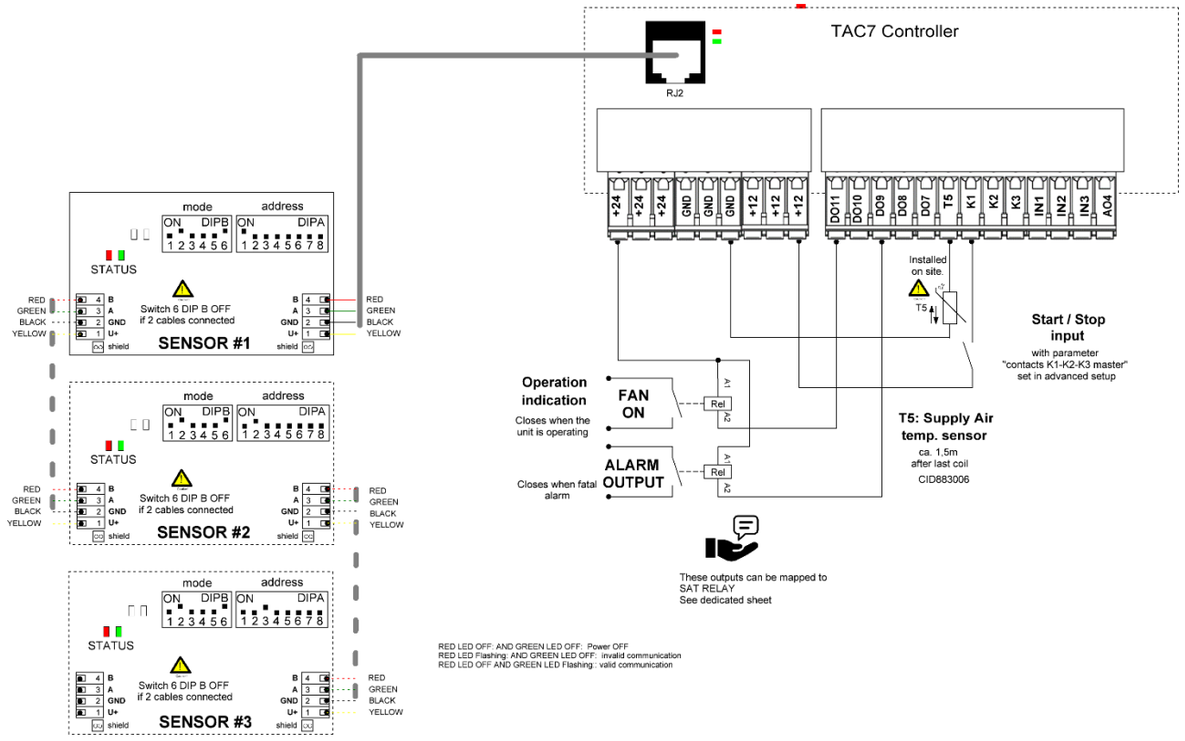
SENSOR CONFIGURATION

Section Airflow/Operation Level/ Parameters:			
Air quality sensors	1, 2 or3		
Section Airflow/Settings - Air Quality sensors - Type/ Parameters:			
Type	Analogue 0-10V CO2 [ppm]|		| RH [%]
Scale Factor	20		1
Section Airflow/Settings - Air Quality sensors -Analogue/ Parameters:			
I/O Vmin Vmax	K2 or K3 if K2 not free and K3 well 0 V 10 V		
Mininum level Maximum level	0 2000		0 100

TAC7

Functions/Air flow – Demand Control mode

- **Operation (parameter "Air Quality sensors" set to 1, 2 or 3):**
  - **TACtouch or network: "Contacts K1/K2/K3 master" set to "NO". TACtouch position "Normal" for start, "Reduced" for K3 reduction factor. Stop for soft stop.**
  - **Wiring diagrams with Modbus sensor(s):**



Master Selection for fan speed is "Contacts K1/K2/K3"
⇨ controlled by TAC7/viewer

K1 closed/closed ⇨ soft start/stop, if controlled by TAC7
K1+K3 closed/open ⇨ % on K3 activated/inactive, if controlled by TAC7

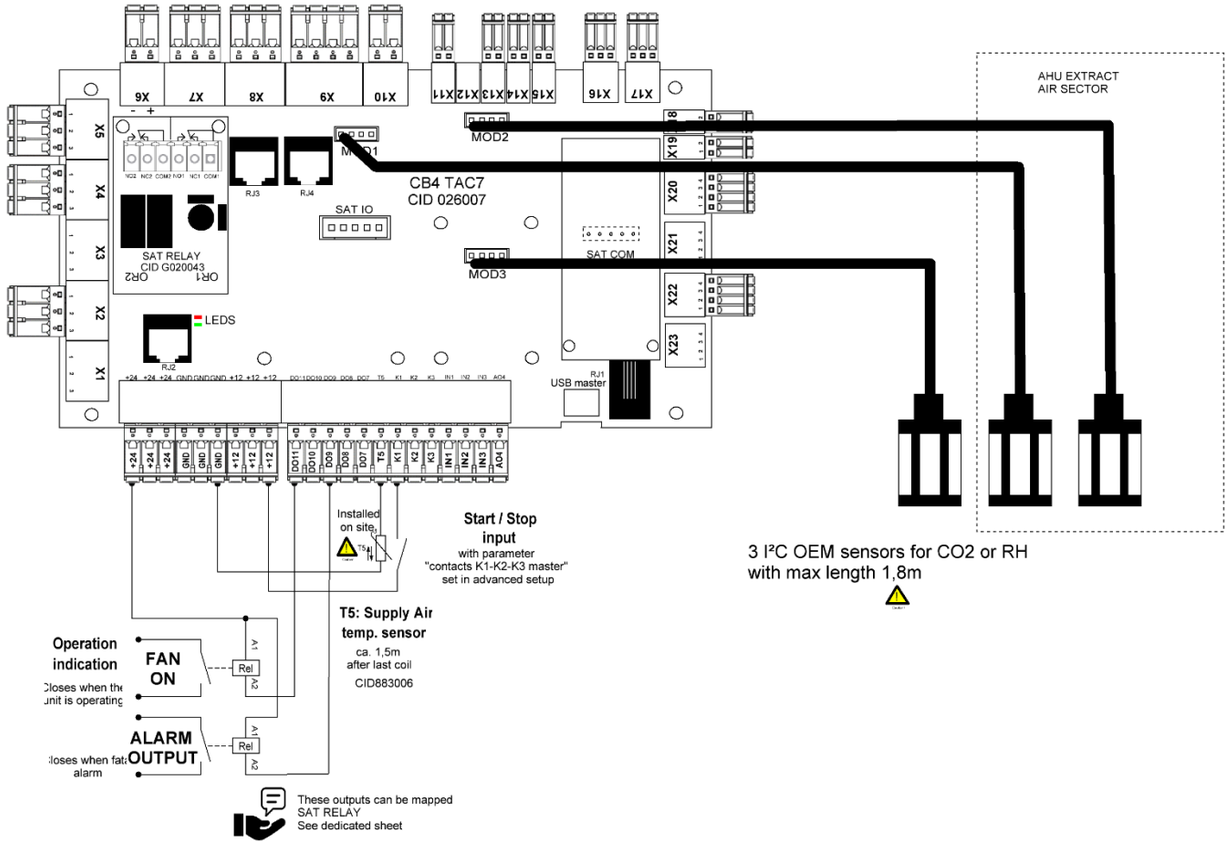
SENSOR CONFIGURATION

Section Airflow/Operation Level/ Parameters:			
Air quality sensors	1, 2 or3		
Section Airflow/Settings - Air Quality sensors - Type/ Parameters:			
Air quality sensor Type	MODBUS INPUT CO2 [ppm]| VOC [%]	| RH [%]	
Scale Factor	1	0,1	0,1
Section Airflow/Settings - Air Quality sensors - Modbus / Serial/ Parameters:			
Air quality sensor Modbus/Serial	CO2 [ppm]| VOC [%]	| RH [%]	
Min. Level Max. Level Register Bus Address	350 min 5000 max 0	0 min 100 max 2	0 min 100 max 6
	BUS#4: EXT (RJ2) 128, 64, 32 for sensor#1,2,3		

TAC7

Functions/Air flow – Demand Control mode

- **Operation (parameter "Air Quality sensors" set to 1, 2 or 3):**
  - **TACtouch or network: "Contacts K1/K2/K3 master" set to "NO". TACtouch position "Normal" for start, "Reduced" for K3 reduction factor. Stop for soft stop.**
  - **Wiring diagrams with Serial communication sensor(s) –**



Master Selection for fan speed is "Contacts K1/K2/K3"
⇨ controlled by TAC7/viewer

K1 closed/closed ⇨ soft start/stop, if controlled by TAC7
K1+K3 closed/open ⇨ % on K3 activated/inactive, if

SENSOR CONFIGURATION

Section Airflow/Operation Level/ Parameters:			
Air quality sensors	1, 2 or3		
Section Airflow/Settings - Air Quality sensors - Type/ Parameters:			
Type	SERIAL CO2/Humidity CO2 [ppm]|		| RH [%]
Scale Factor	1		1
Section Airflow/Settings - Air Quality sensors - Modbus / Serial/ Parameters:			
Air quality sensor Modbus/Serial	CO2 [ppm]|		| RH [%]
Min. Level Max. Level	0 min 5000 max		0 min 95 max
Bus	BUS#1 I2C1 (MOD1)/ BUS#2 I2C2 (MOD2)/ BUS#3 I2C3 (MOD3)		

TAC7

Functions/Air flow – Demand Control mode

- **Associated information status:**

Dashboard/Indication about the current “controller” of the speed: TACtouch or K1/K2/K3

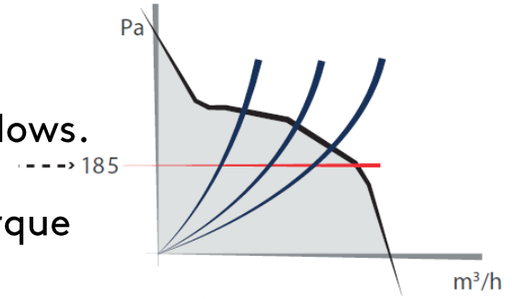
Function Air Flow/Status: setpoint for supply and exhaust in m^3/h or l/s according to configurated air flow unit.

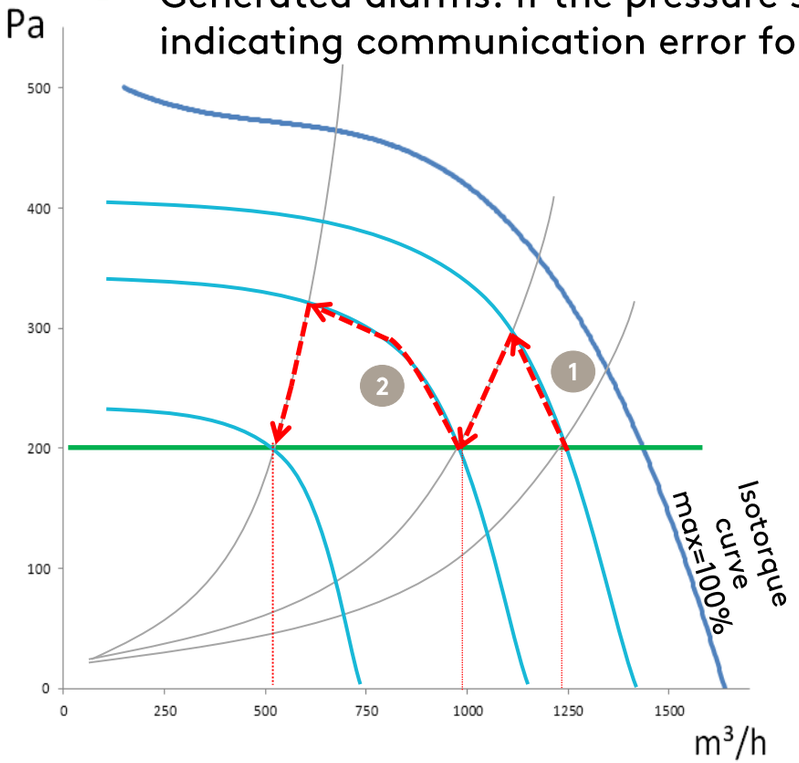
Function Air Flow/Status – Air quality sensors: when at least 1 air quality sensor has been configured, visualization of its measured value directly available in the unit of the sensor (ppm or %).

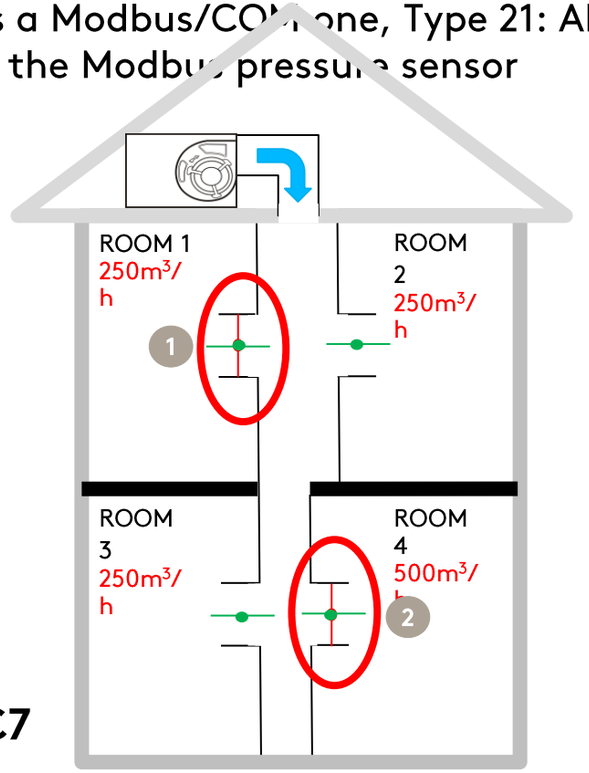
Dashboard/Flow chart: Setpoint in blue and actual airflow in black (see Function Air Flow/Status for unit). For serial air quality sensor, visualization of its measured value directly available in the unit of the sensor (ppm or %).

Functions/Air flow – Constant Pressure mode

- **Constant pressure mode (CP):**
  - **Description:**
    - Possibility to have the reference pressure on supply or exhaust or both flows.
    - Typical application: multi-zone with dampers for each zone
    - The computed pressure is kept constant at a reference level through torque modulation.
    - Fast initialization of the reference pressure with pressure calculation at known and accurate initialization airflow.
    - Generated alarms: if the pressure sensor is a Modbus/CO[illegible]one, Type 21: Alarm indicating communication error for one of the Modbu[illegible] pressure sensor







TAC7

Functions/Air flow – Constant Pressure mode

- **Setup:**

Function Air flow /Regulation Mode
- Regulation Mode: Air flow regulation mode. Select Constant Pressure.

Regulation Mode

Function Air flow /Operation Level

Operation Level

Definition of the airflow/pressure levels associated to current regulation mode

- Extract/Supply: Percentage of extract air flow compared to the supply air flow.

- Reduction factor: Reduction factor applied to the setpoint. Reduction factor applied to the setpoint. This is activated via the start/stop button in the dashboard, then selecting "Reduced", or by connecting K3 to + 12V.

- Initialization mode: Initialization of “Constant pressure” mode, based on a pressure an air flow setpoint. When based upon an airflow setpoint, the pressure setpoint is calculated automatically.

- Supply reference pressure: Pressure set point for the supply air. Used with initialization based on Pressure and with parameter “Sensors in air flow”, in section “Pressure sensors” set to “Supply”, or “Supply & Exhaust”.

- Extract reference pressure: Pressure set point for the extract air. Used with initialization based on Pressure and with parameter “Sensors in air flow”, in section “Pressure sensors”, set to “Exhaust” or “Supply & Exhaust”.

- Supply air flow initialization: Nominal air flow for the supply air. This will determine the pressure setpoint. Used with initialization based on air flow and with parameter “Sensors on flow”, in section “Pressure sensors”, set to “Supply” or “Supply & Exhaust”.

- Extract air flow initialization: Nominal air flow for the extract air. This will determine the pressure setpoint. Used with initialization based on air flow and with parameter “Sensors on flow”, in section “Pressure sensors”, set to “Exhaust” or “Supply & Exhaust”.

- Reference pressure init.: Initialization of the reference pressure used by the pressure alarm. After +/-1 minute the reference pressure is stored. Used with initialization based on air flow.

Functions/Air flow – Constant Pressure mode

- **Setup:**

Function Air flow / Pressure sensors

Pressure sensors

- Sensors in air flow: Selection of the flows where the pressure sensors are located

- Sensor for “Constant pressure”: Type of pressure sensor used in “Constant Pressure” mode. Select 0-10V if it is a sensor with analogue output, select Modbus if it is a sensor with Modbus communication

- Advanced settings for pressure sensors of CP mode: Advanced configuration of pressure sensors allowing modifications of settings respect to defaults

Function Air flow / Constant pressure Algorithm

Constant pressure Algorithm

Configuration of the Regulation speed and logic of the algorithm for the “Constant pressure” regulation mode

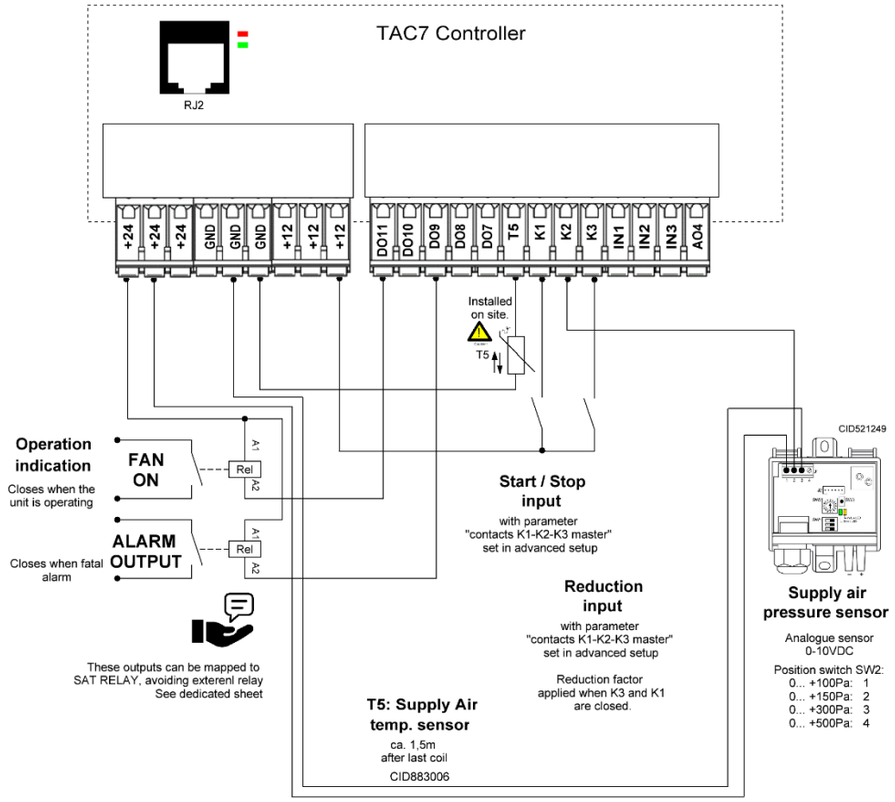
- Regulation speed: Regulation speed. Default speed=T.

Slower regulation for the high values, faster regulation for the lower values.

- Logic: Negative logic: the air flow decreases if the measured pressure is higher than pressure setpoint, the air flow increases if the measured pressure is lower than pressure setpoint. Positive logic: the air flow increases if the measured pressure is higher than pressure setpoint. the air flow decreases if the measured pressure is lower than pressure setpoint.

Functions/Air flow – Constant Pressure mode

- **Operation:**
  - **TACtouch or network: “Contacts K1/K2/K3 master” set to “NO”. TACtouch position “Normal” for start, “Reduced” for K3 reduction factor. Button OFF for soft stop.**
  - **Wiring with 0-10V Pressure sensors if CPs on SUPPLY or CPs on EXHAUST :**



Master Selection for fan speed is “Contacts K1/K2/K3”

⇨ controlled by TAC7/viewer

K1 closed/open ⇨ soft start/stop, if controlled by TAC7

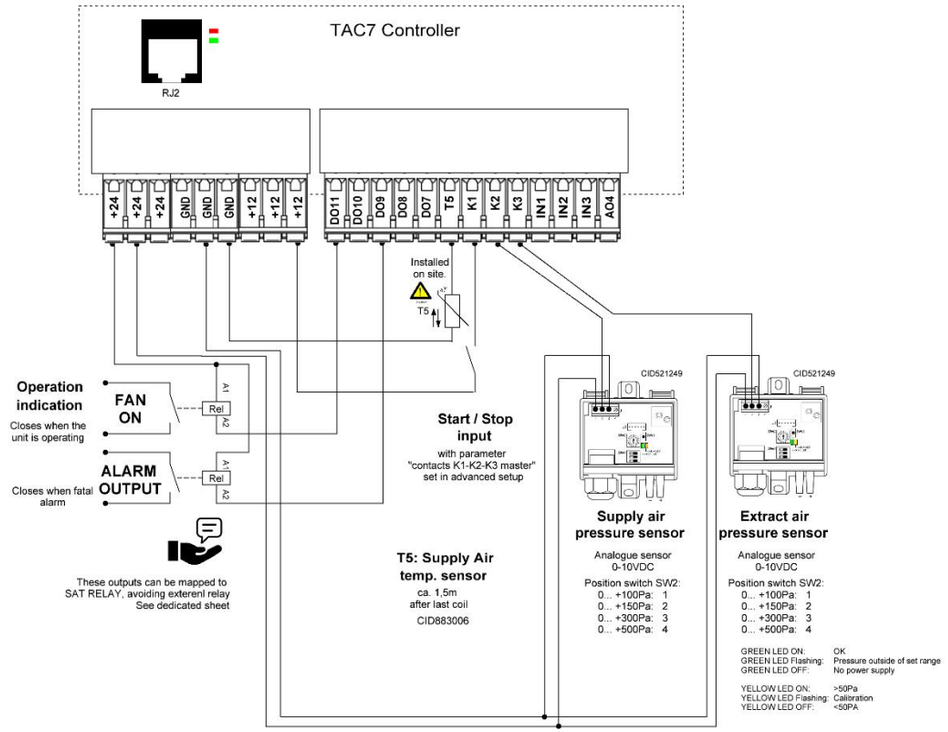
K2 ⇨ 0-10V signal, maximum impedance allowed: 1500 Ω

K1+K3 closed/open ⇨ % on K3 activated/inactive, if controlled by TAC7

TAC7

Functions/Air flow – Constant Pressure mode

- **Operation:**
  - **Wiring with 0-10V Pressure sensors if CPs on SUPPLY and EXHAUST :**



Master Selection for fan speed is "Contacts K1/K2/K3"

⇨ controlled by TAC7/viewer

K1 closed/open ⇨ soft start/stop, if controlled by TAC7

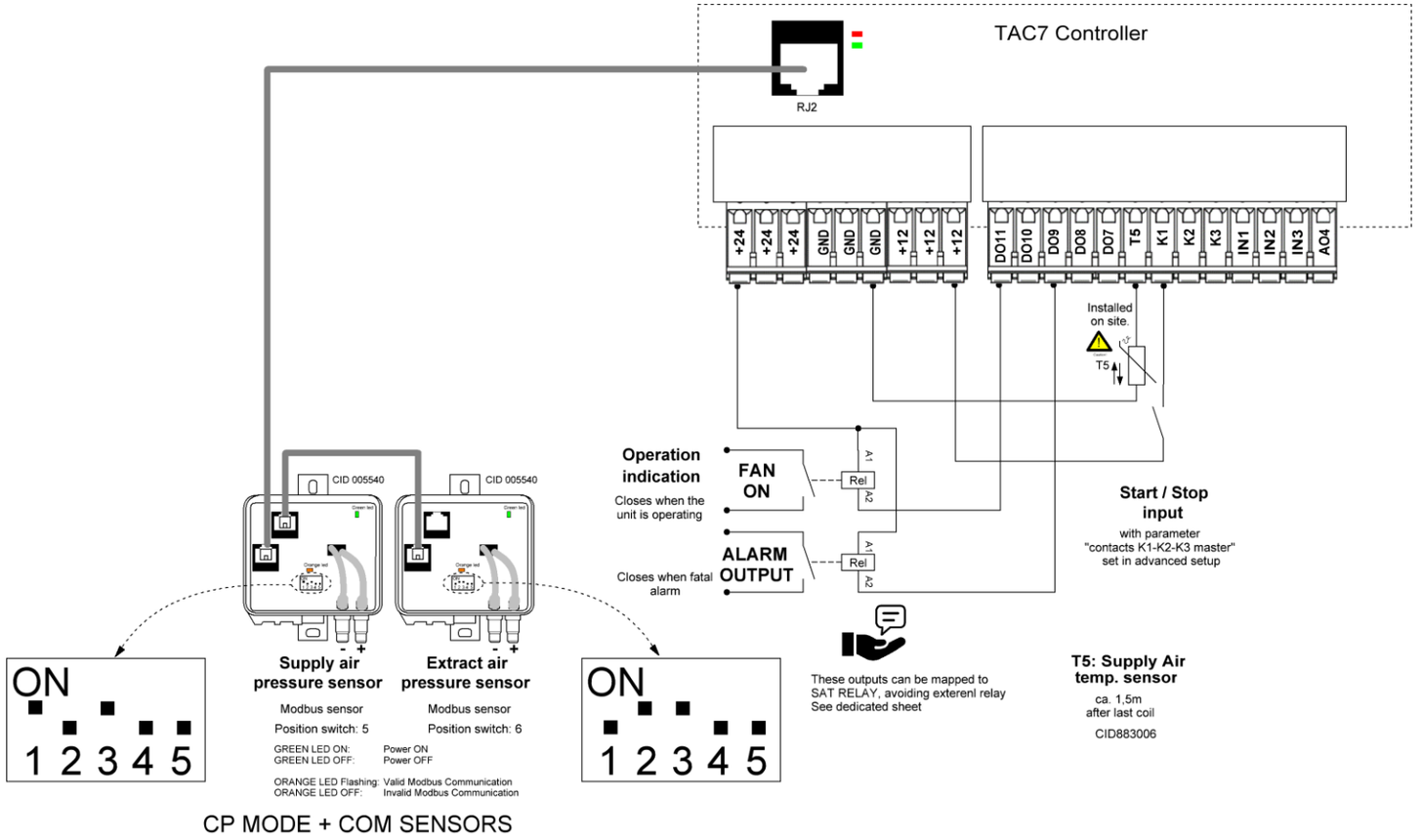
K2 ⇨ 0-10V signal for supply, maximum impedance allowed: 1500 Ω

K3 ⇨ 0-10V signal for exhaust, maximum impedance allowed: 1500 Ω

TAC7

Functions/Air flow – Constant Pressure mode

- **Operation:**
  - **Wiring with Modbus Pressure sensor(s) if CPs on SUPPLY and/or EXHAUST :**



Master Selection for fan speed is "Contacts K1/K2/K3"

⇨ controlled by TAC7/viewer

K1 closed/open ⇨ soft start/stop, if controlled by TAC7

K1+K3 closed/open ⇨ % on K3 activated/inactive, if controlled by TAC7

TAC7

Functions/Air flow – Constant Pressure mode

- **Associated information status:**

  Dashboard/Indication about the current “controller” of the speed: TACtouch or K1/K2/K3

  Function Air Flow/Status: setpoint for supply and exhaust in Pa.

  N.B.: if parameter “Sensors on flow”, in section “Pressure sensors” set to “Supply”, or “Exhaust”, then setpoint for the other flow without sensor will be in m³/h or l/s according to configurated air flow unit; measured pressure returned by sensor in Pa.

  Dashboard/Flow chart: on each fan, setpoint in blue and actual airflow in black (see Function Air Flow/Status for unit).

  Dashboard/Process Status: Initialization of reference pressure when this one has been started.

Functions/Air flow/BOOST

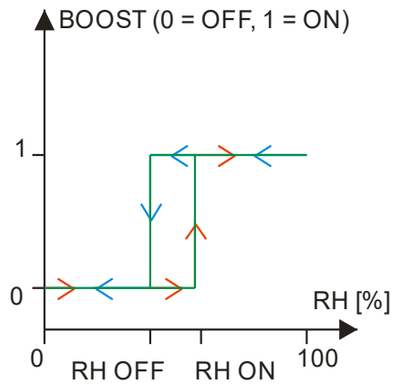
The BOOST function allows forcing a preset airflow overruling all other configurations

- **Description:**

This feature forces the supply and exhaust airflows to configurable values with a greater priority respect to the normal working mode.

Activation:

- Contact
- TACtouch/Communication.
- Air quality sensor (0-10V analogue/Modbus): CO2/VOC/Relative humidity threshold. Boost activated when the high sensor value threshold has been reached. Example with Relative Humidity sensor:



Generated alarm: Type 2 - Alarm indicating a fan failure, Type 5: Alarm indicating the system cannot fulfil the set point

Functions/Air flow/BOOST

- **Setup:**

Function Air flow / BOOST

BOOST

Configuration of the extract and supply air flows if the Boost function is activated. Boost has higher priority than TACtouch, K1-K2-K3contacts and time schedules. Therefore, it will overrule these last control modes.

- Supply air flow: Supply air flow when the Boost function is active. In m³/h or l/s according to configurated air flow unit and modulation type.

- Extract air flow: Extract air flow when the Boost function is active. In m³/h or l/s according to configurated air flow unit and modulation type.

- BOOST factor: Increasing factor during supply air boost in CPs/CPf mode. Disabled if 0, then boost at fixed airflow is used.

- BOOST duration: Delay in minutes after which the boost, due to communication and sensors, is stopped. For the contact, if a push button is used, the boost will last this duration. Otherwise, if contact switch is used, the boost will continue to be active because its status will be re-evaluated just after the delay. Value -1 will disable this feature.

- Air Quality sensors: Configuration of air quality sensors for boosting at specific threshold

Functions/Air flow/BOOST

- **Setup:**

Function Air flow / BOOST - Air Quality sensors - Type

BOOST - Air Quality sensors - Type

Configuration of quality sensors types: measured physical magnitude, output value as analogue voltage or data on communication bus, scale factor to obtain directly readable and converted measured value in desired physical unit.

- Measure: Measured physical magnitude by the sensor

- Type: Output value by sensor as analogue voltage or data on communication bus: Modbus or Serial

- Scale Factor: Scale factor to obtain directly readable and converted measured value from sensor in desired physical unit

- High level BOOST on: High level for boost activation for the signal of corresponding sensor, if associated to boost control

- Low level BOOST off: Low level for boost deactivation for the signal of corresponding sensor, if associated to boost control

Functions/Air flow/BOOST

- **Setup:**

Function Air flow / BOOST - Air Quality sensors - Analogue

BOOST - Air Quality sensors - Analogue

Configuration of the analogue input used for the sensors and of the linear link between their output voltages and corresponding scaled values of physical measured magnitude

- I/O: Selection of analogue input used for the sensor.
- Vmin: Minimum voltage of the sensor connected to Analogue Input.
- Vmax: Maximum voltage of the sensor connected to Analogue Input.
- Min. Level: Minimum level that the sensor can output.
- Max. Level: Maximum level that the sensor can output.

Function Air flow / BOOST - Air Quality sensors - Modbus/Serial

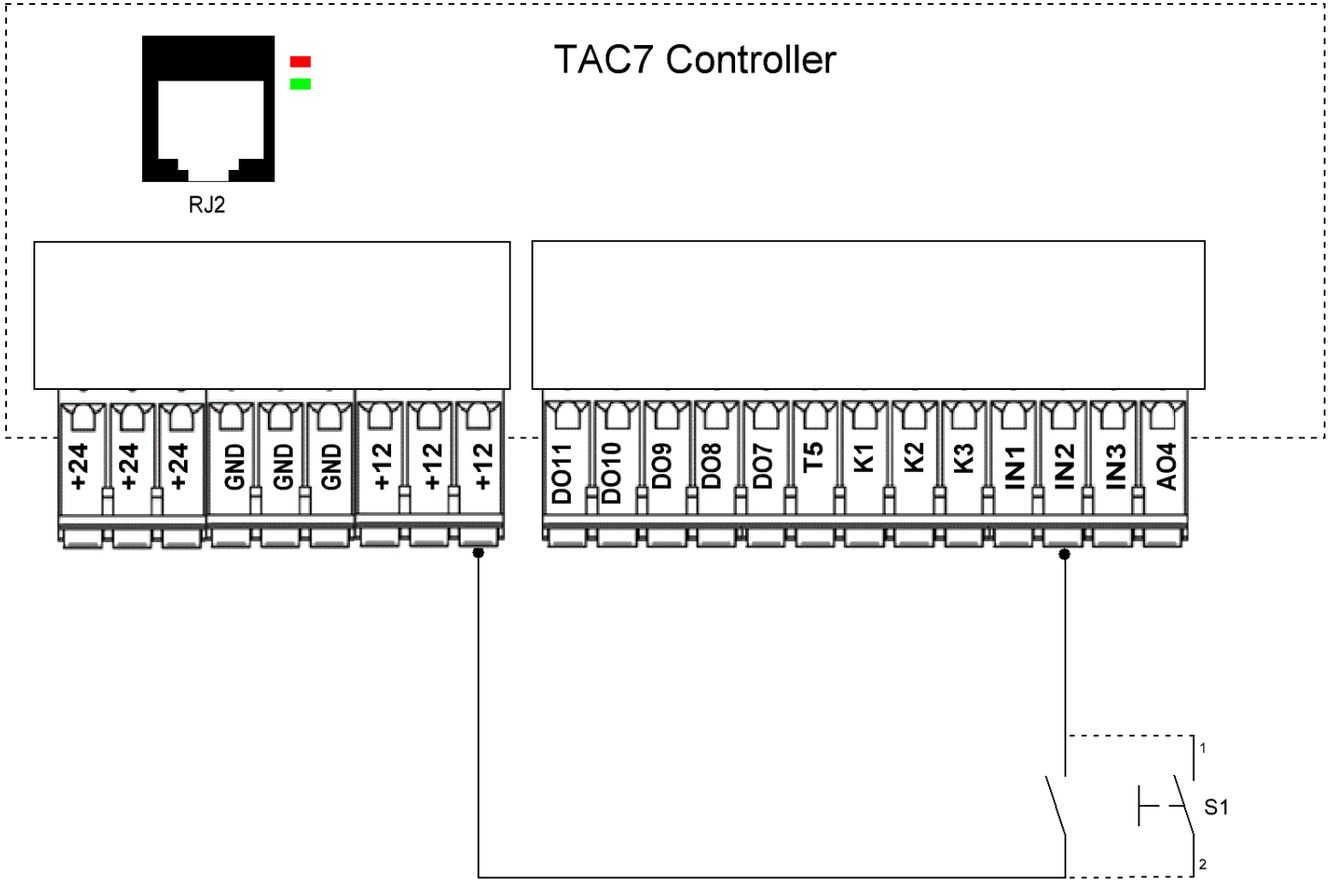
BOOST - Air Quality sensors - Modbus/Serial

Configuration of the bus to which the sensor is connected to, the scaled measurement range, and for Modbus sensors, their address as well their Modbus register type and number used

- Bus: Bus on which the sensor is connected to. Used for Modbus/serial sensor type.
- Address: Address of the sensor. Used for Modbus type
- Register: Modbus register to access of the sensor. Used for Modbus type
- Min. Level: Minimum level that the sensor can output.
- Max. Level: Maximum level that the sensor can output.

Functions/Air flow/BOOST

- **Wiring – BOOST with contact:**

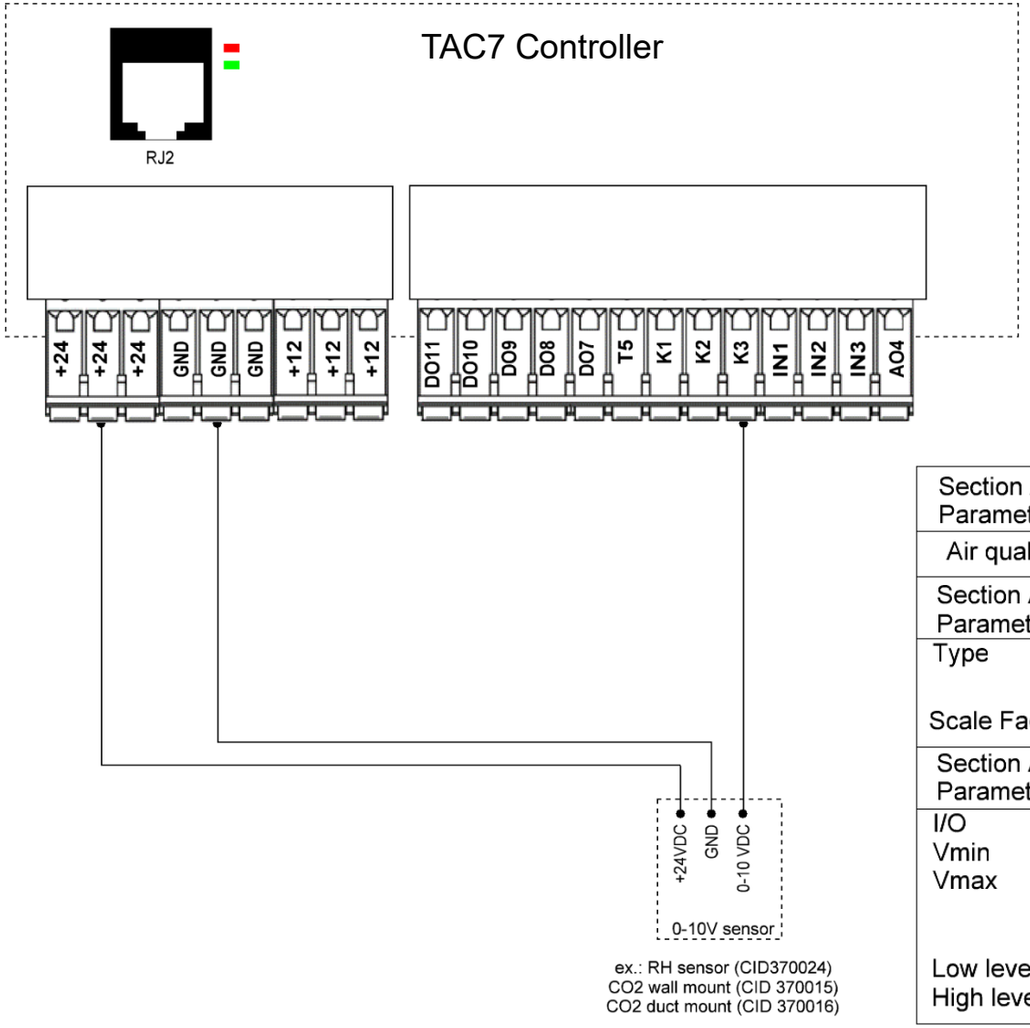


In case a push button is used instead of a switch, then configure parameter "BOOST duration" in Function Air flow/BOOST with a delay in minutes.

TAC7

Functions/Air flow/BOOST

- **Wiring – BOOST with 0-10V analogue sensor:**

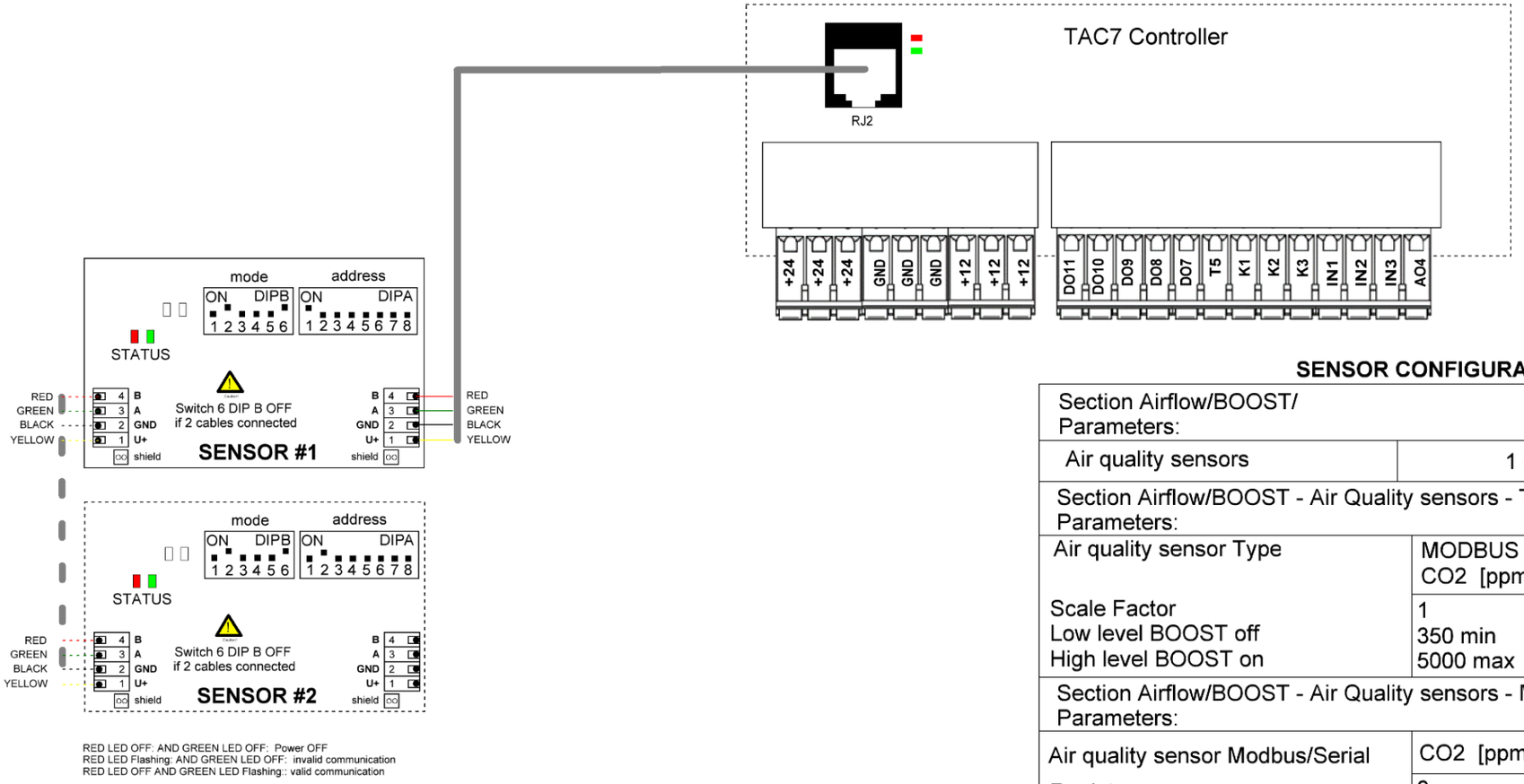


SENSOR CONFIGURATION

Section Airflow/BOOST/ Parameters:			
Air quality sensors	1 or 2		
Section Airflow/BOOST - Air Quality sensors - Type/ Parameters:			
Type	Analogue 0-10V CO2 [ppm]		| RH [%]
Scale Factor	20		1
Section Airflow/BOOST - Air Quality sensors -Analogue/ Parameters:			
I/O Vmin Vmax	K2 or K3 0 V 10 V		
	CO2 [ppm]		| RH [%]
Low level BOOST off High level BOOST on	100 min 1900 max		5 min 95 max

Functions/Air flow/BOOST

- **Wiring – BOOST with IAQ sensors (Indoor Air Quality):**
- N.B.: for wiring with serial com sensor, see section Functions/Air Flow – Demand Control



SENSOR CONFIGURATION

Section Airflow/BOOST/ Parameters:			
Air quality sensors	1 or2		
Section Airflow/BOOST - Air Quality sensors - Type/ Parameters:			
Air quality sensor Type	MODBUS INPUT CO2 [ppm]| VOC [%]		| RH [%]
Scale Factor Low level BOOST off High level BOOST on	1 350 min 5000 max	0,1 0 min 100 max	0,1 0 min 100 max
Section Airflow/BOOST - Air Quality sensors - Modbus / Serial/ Parameters:			
Air quality sensor Modbus/Serial	CO2 [ppm]| VOC [%]		| RH [%]
Register	0	2	6
Bus Address	BUS#4: EXT (RJ2) 128, 64 for sensor#1,2		

Functions/Air flow/BOOST

- **Associated information status:**

  Dashboard/Control Status: BOOST

  Function Air Flow/Status: setpoint for supply and exhaust

  Function Air Flow/Status – Air Quality sensors: sensors read values for BOOST if configured

  Function Air Flow/Status – Air quality sensors: when at least 1 air quality sensor has been configured, visualization of its measured value directly available in the unit of the sensor (ppm or %).

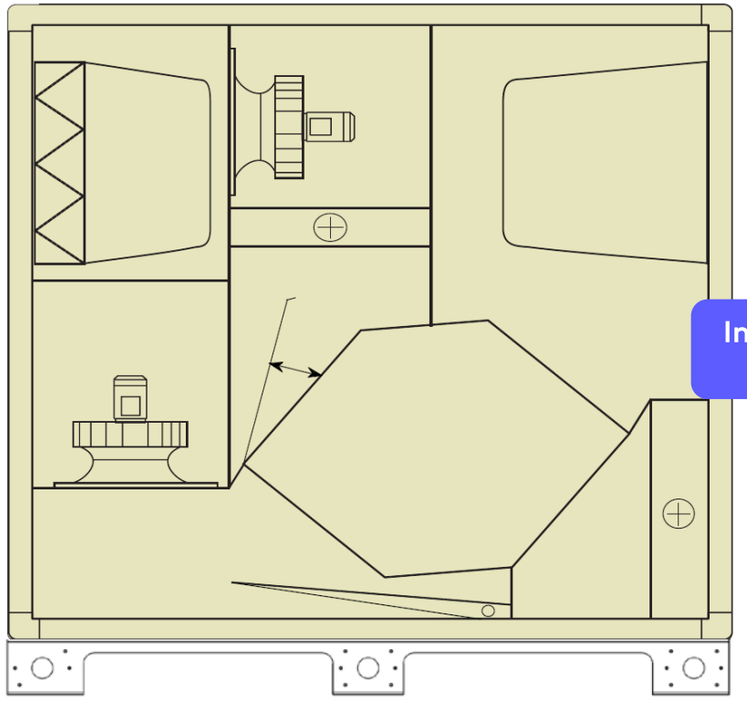
  Dashboard/Flow chart: for serial air quality sensor, visualization of its measured value directly available in the unit of the sensor (ppm or %).

Functions/Temperature

Temperature

Functions – Temperature:

Configuration of the temperature regulation settings.



Internal reheating coil

External coil (+/-)

TAC7

Functions/Temperature

Status

Settings

Functions – Temperature - Status:

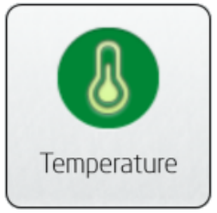
All the relevant values can be read here. Used for performance Checks

Functions – Temperature - Settings

- Setpoint temperature: Comfort temperature setpoint: in automatic changeover between heat and cool, desired temperature to reach and maintain through the activation of heating battery when in heat zone or, when in cool zone, by the activation of the bypass of the heat exchanger and/ or the activation of the cooling battery. The regulation temperature parameter defines which sensor is used as reference to measure the gap in comparison to this setpoint.
- Heating temperature: Heating temperature setpoint: desired temperature to reach and maintain through the activation of heating battery when heat mode is selected via TACtouch or electric contact. The regulation temperature parameter defines which sensor is used as reference to measure the gap in comparison to this setpoint.
- Cooling temperature: Cooling temperature setpoint: desired temperature to reach and maintain through the activation of the bypass of the heat exchanger and/ or the activation of the cooling battery when cool mode is selected via TACtouch or electric contact. The regulation temperature parameter defines which sensor is used as reference to measure the gap in comparison to this setpoint.

Functions/Temperature

Regulation Mode



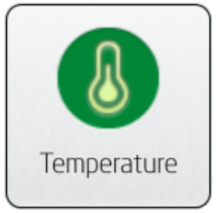
Functions – Temperature - Regulation Mode

Settings for temperature regulation.

- Stop if supply air temperature < 5°C: The fans stop if the temperature of the supply air falls below 5°C.
- temperature regulation air flow: temperature regulation can be based on supply air temperature, extract air temperature, temperature from TACtouch, temperature from temperature measurement of sensor n°4. The temperature measured will be compared with the reheating or recooling setpoint temperature. When based on TACtouch or measurement sensor, these ones must be mounted following carefully their installation manual to have the most valid temperature reading of the desired ambient or room.
- Regulation speed: Slower regulation for the high values, faster regulation for the lower values. Used only when temperature regulation is not based on value measured on supply air.
- Supply air temperature MIN: Lower limit value for the supply air temperature. Used only when temperature regulation is not based on value measured on supply air.
- Supply air temperature MAX: Upper limit value for the supply air temperature. Used only when temperature regulation is not based on value measured on supply air.

Functions/Temperature

Summer Night Free cooling



Functions – Temperature – Summer Night Free cooling

Freecooling is obtained by bypassing the heat exchanger during a specific period of the year and of the day, if outdoor air temperature is lower than the extract air temperature (min. 1°C lower, by default) otherwise another check will be done after 60 minutes (by default).
This verification is done with fans ON, meaning that they would be eventually started at low speed, if they were stopped, for the temperature test during configured time (0 value for this time will disable the fans start in case they are OFF).
If conditions are all verified, freecooling is started and the fans will run at specific setpoints to quickly reach the freecooling temperature setpoint. The bypass activation will be modulated in such a way that the measured regulation temperature (see parameter "temperature regulation air flow") will reach the freecooling temperature setpoint.
Freecooling is stopped outside the given period of allowed activity or when fresh air temperature becomes higher than the extract air flow (min. 1°C higher, by default).

- Temperature freecooling: Temperature setpoint during freecooling: desired temperature to reach and maintain through the activation of freecooling. The regulation temperature parameter defines which sensor is used as reference to measure the gap in comparison to this setpoint.
- Freecooling factor: Increasing factor during freecooling for supply and/or exhaust in CP mode.- Supply air flow: Supply air flow during freecooling
- Extract air flow: Extract air flow during freecooling
- Start/end date From (DDMM) / To (DDMM): Start and end date for freecooling
- Start/end time From / To: Start and end time for freecooling
- Try time with fans on: Time to let run the fans at freecooling start period if they were stopped. This will allow to have a good evaluation about the fresh air

Functions/Temperature

Changeover

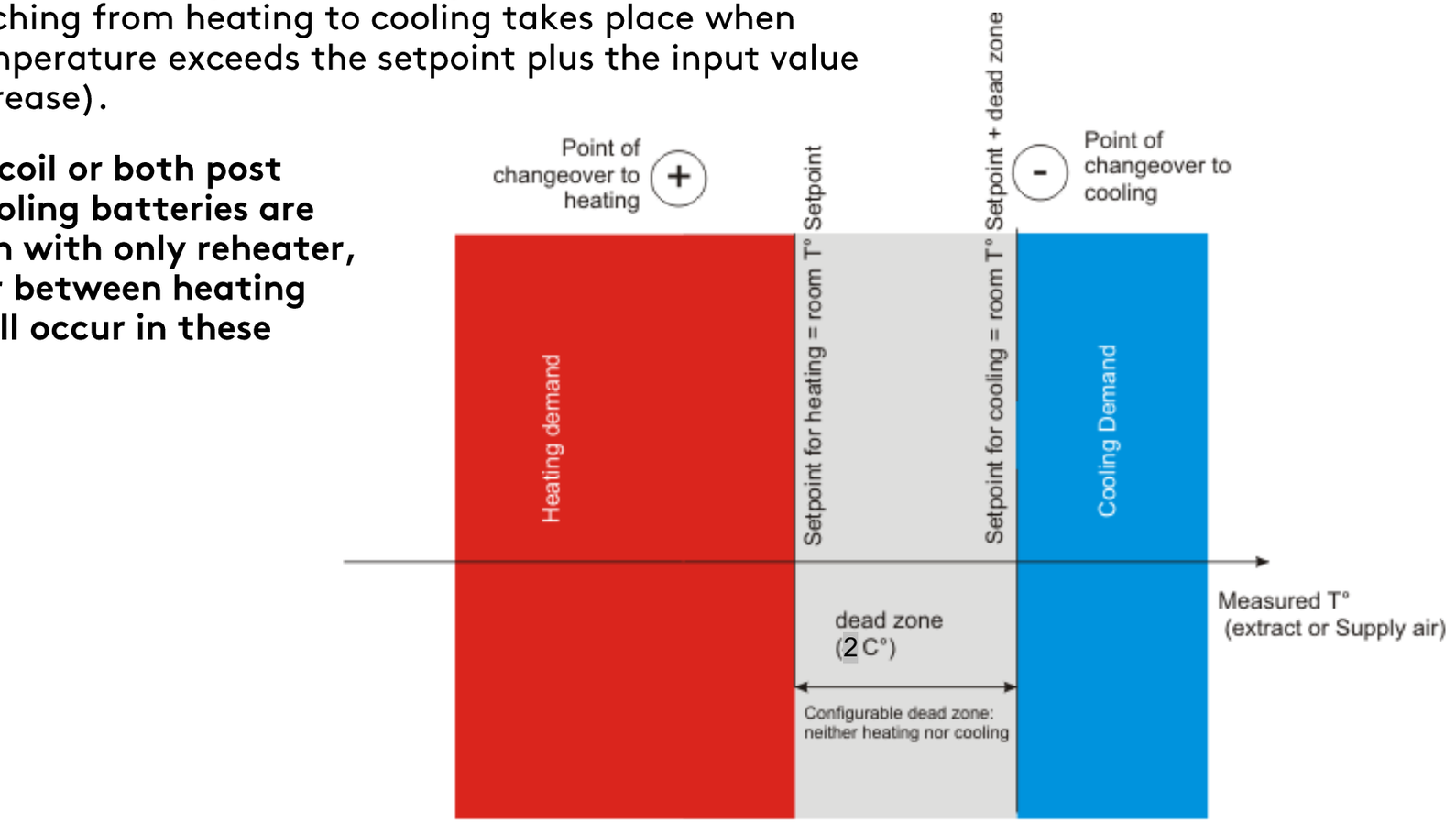
Temperature

Functions – Temperature - Changeover

Configuration permitting an automatic changeover between reheating and recooling.

- Activation of the changeover: Activation of the automatic changeover between reheating and recooling.
- Neutral band: Switching from heating to cooling takes place when the measured temperature exceeds the setpoint plus the input value (temperature increase).

When a combi-coil or both post heating and cooling batteries are present, or even with only reheater, the changeover between heating and cooling, will occur in these conditions:



TAC7

Functions/Temperature

Functions – Temperature - Changeover

- Rule:
  - Heating change over: temperature comfort measured < temperature comfort setpoint then start heating.
  - Cooling change over: temperature comfort measured > temperature comfort setpoint + Neutral band (2°C) then start cooling, with temperature setpoint for cooling/freecooling = temperature comfort setpoint + Neutral band
  - Bypass activation allowed only in cooling zone. If conditions for bypass activation are present, it will occur before to activate cooling. This last one is allowed with bypass completely active or completely inactive.
  - No switch until current output for heating or cooling is active.

  where
  - temperature comfort measured: is the temperature measured by the sensor temperature placed on extract or supply flow (depending if comfort on extract or supply air is selected).
  - temperature comfort setpoint: is the comfort temperature setpoint for both heating and cooling, with the addition of the dead zone temperature value for cooling. It is a parameter that can be configured.
  - Neutral band : is a temperature range used to define a hysteresis above temperature comfort setpoint.

- Possibility to map digital outputs for the indication of heating and/or cooling.

Functions/Temperature

- **Associated information :**

  Dashboard/Control Status: “Freecooling” during freecooling

  Dashboard/Process Status: HEAT if heating active, COOL if cooling active, BYPASS if bypass of the heat exchanger is activated.

  Function Temperature/Status: measured Temperature, current comfort measured temperature, heat status, cool status, status of freecooling

Functions/Time and schedule

Functions/Time and schedule:

The built-in timer enables to control the AHU's operating mode/time. Certain other oversteering functions such as external timer, communication, etc. affect the preset operating modes.

The time schedule enables the automatic working of the unit following 6 configurable time slots with their own configurable set points. Each days of the week can have its own time slot configuration and can be disabled from automatic mode.

In addition, for each time slots, a different set point for post heating/cooling can be configured.

Description:

- **6 configurable times slots for each days of the week**
- **For each time slots, configuration of:**
  - **the working mode (CA/LS/CP/TQ/OFF). Other working mode than the one configured in the basic setup are available only for LS and CP and will be CA/TQ (depending on modulation type: airflow or torque).**
  - **Selection of fan speed levels: I, II (for CA/TQ only), III or BOOST**
  - **reheating setpoint (0=OFF)**
  - **recooling setpoint (0=OFF)**
- **Configuration and activation with TACtouch**

TAC7

Functions/Time and schedule

Time and date

Functions/Time and schedule/Time and date

Set the time and date.

Time schedules automatic operations

Functions/Time and schedule/Time schedules automatic operations

Set of operations to automatically set/reset time interval parameters

- Reset all time intervals: Reset all parameters for time interval to original values from factory

- The day of week to copy : The day of the week schedule that are to be copied to another day

- The day of week that are to be filled : The day of the week schedule that are to be filled with values copied from day schedule. Day in between will be filled too.

- Copy time schedule: Copy selected time schedule of the day for copying to the day of week schedule that are to be filled. Day in between will be filled too.

- Overwrite heating/comfort temperature setpoint in all time intervals with default value: Overwrite heating/comfort temperature setpoint in all time intervals with default parameter for reheating/comfort temperature setpoint

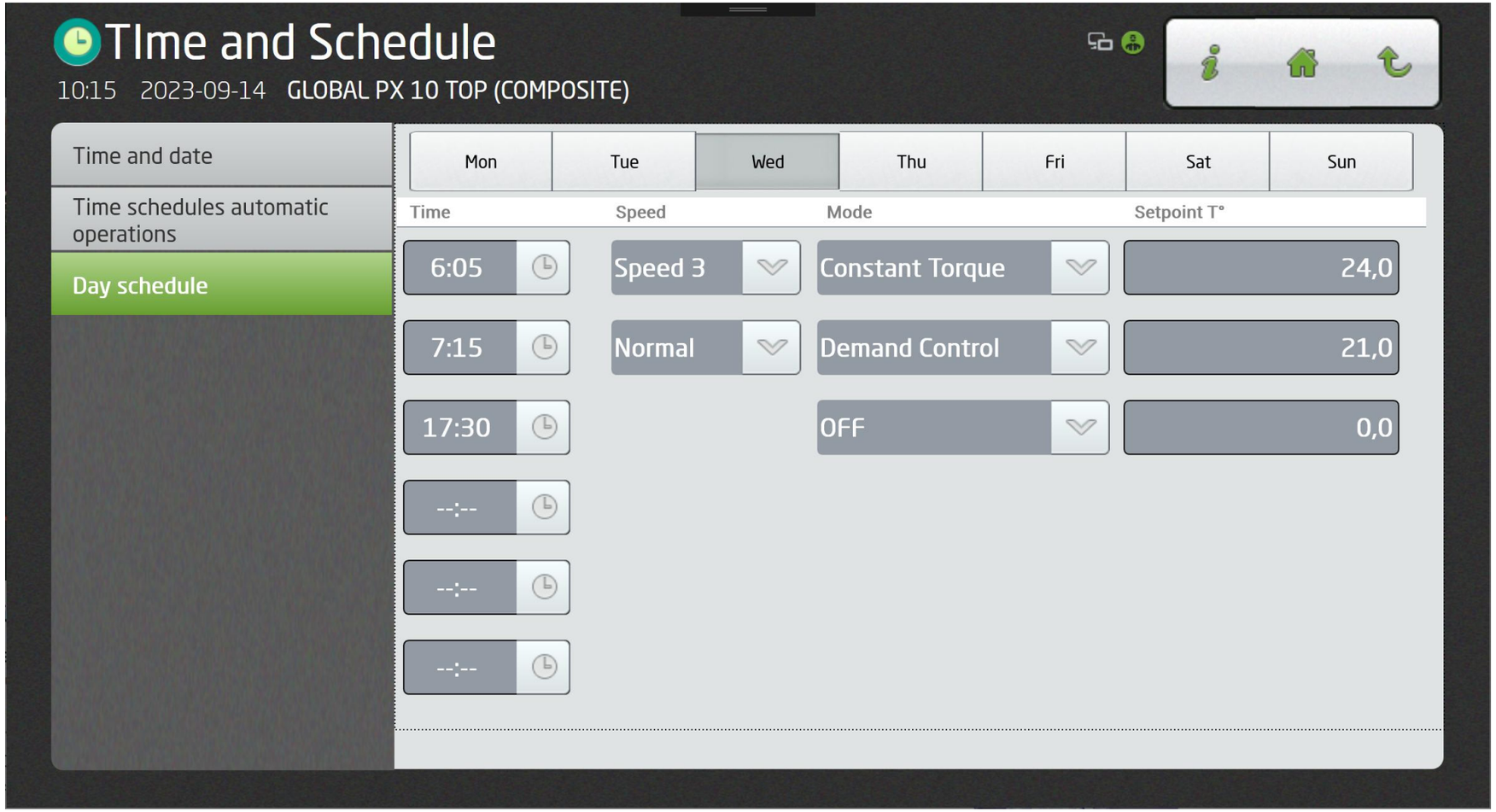
Functions/Time and schedule

Functions/Time and schedule/Day schedule

Day schedule

TIme and Schedule

For each day of the week, define time intervals, select the start time, the regulation mode, the fan speed and the temperature setpoints.



TAC7

Functions/Time and schedule

- **Operation**

  Activation with TACtouch Via AUTO Selection. See “Start/Stop” section of TACtouch description

- **Associated information status :**

  Dashboard/Control Status: AUTO

Functions/Network

Functions/Network:

Management of a network of Air handling Units. They must have different addresses to work correctly.

To add this unit to the network, go in Functions/Communication/Connection Setup and press dedicated button.

To select a unit to communicate with, simply press dedicated button in the network table at its corresponding row.

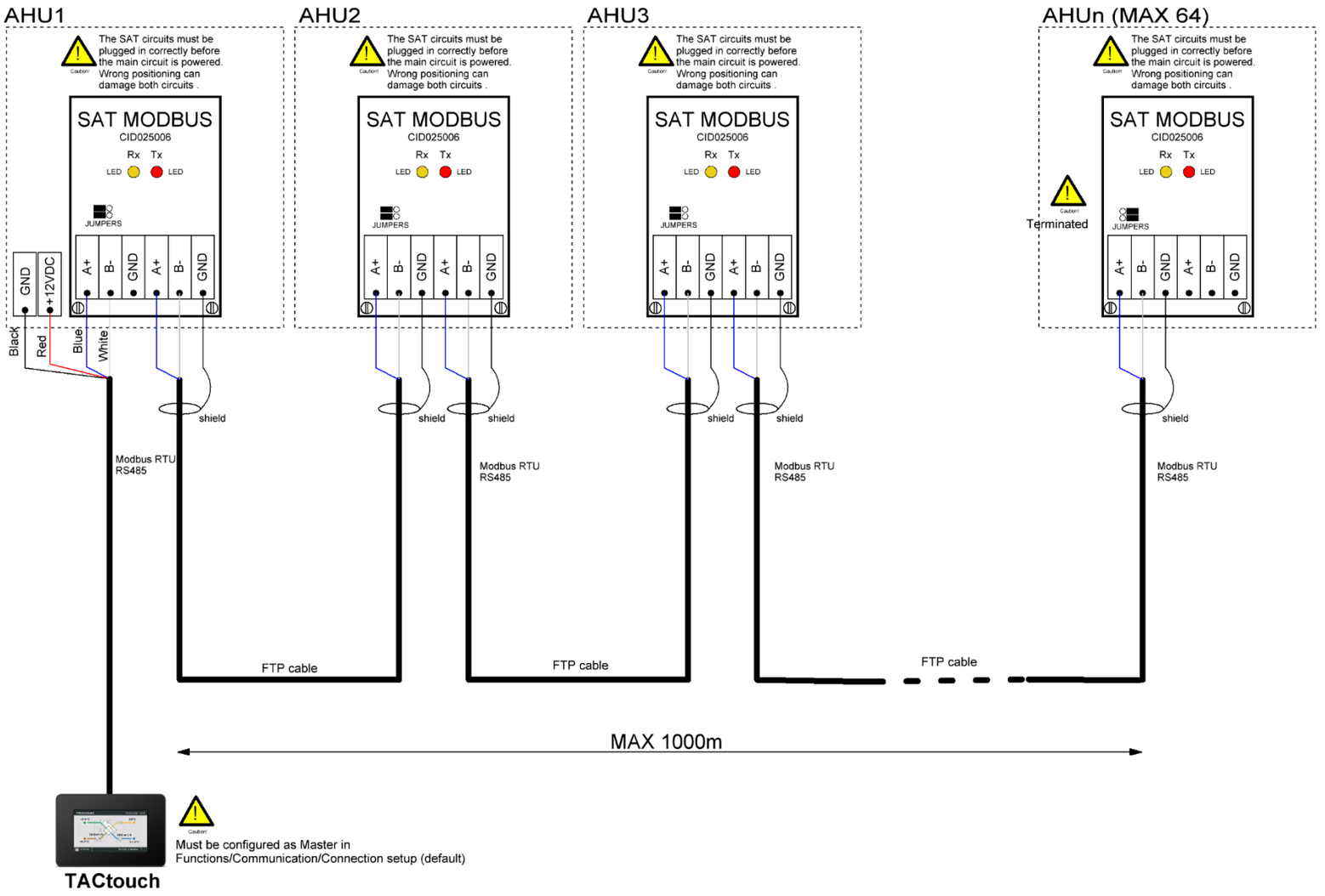
It is strongly advised to give name to the unit in the network to easily find and distinguish them.

- Remove from network: Remove last element of the network list

N.B.: This function will appear only if at least one air handling unit has been added to the network.

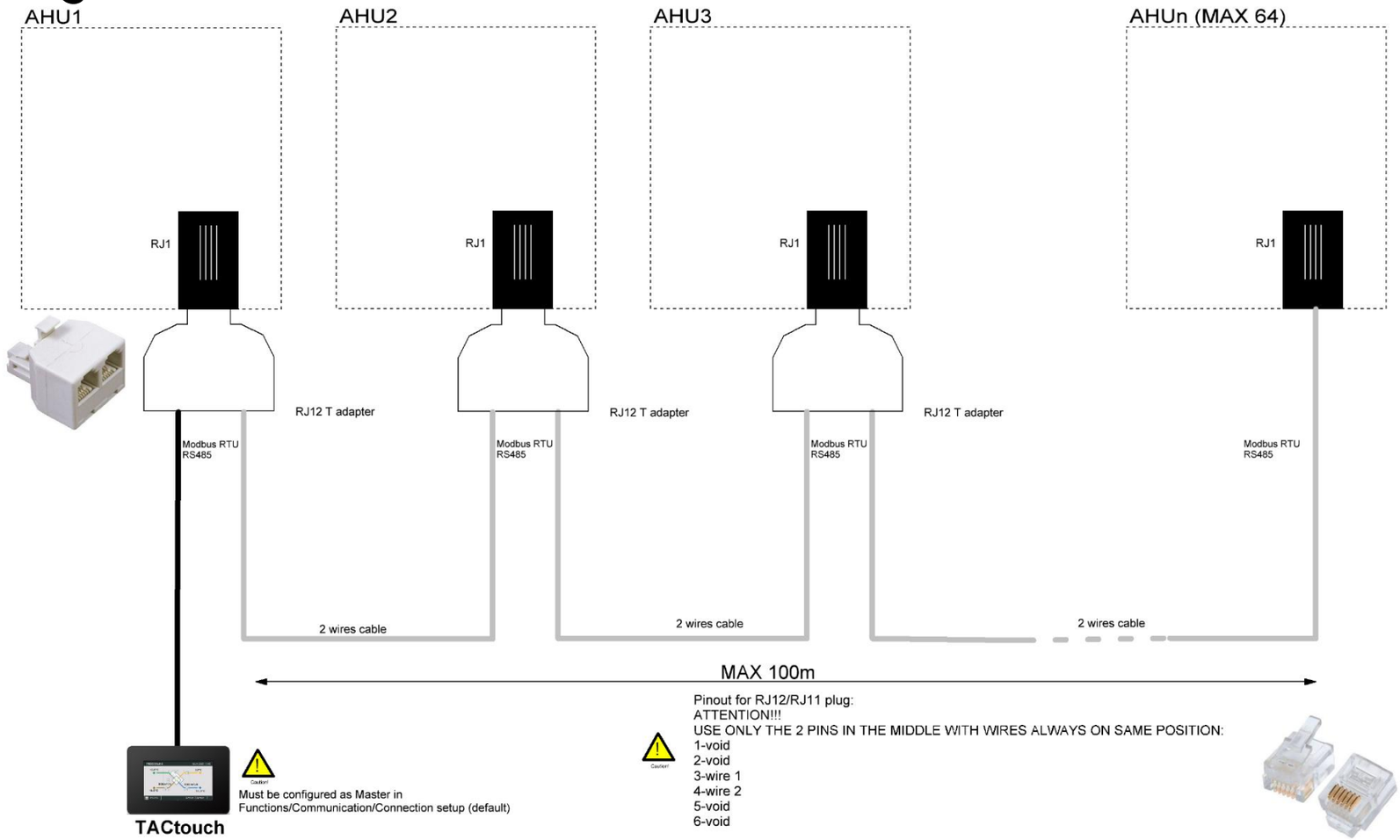
Functions/Network

- **Wiring - TACtouch centralised:**



Functions/Network

- **Wiring - TACtouch centralised short distance:**

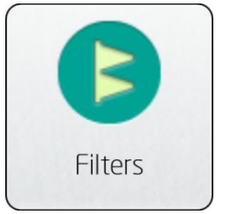


- **Associated information status :**

Dashboard/Header: Specific name of the Air Handling Unit adapted with the one of the unit that has been selected for communication.

TAC7

Functions/Filters

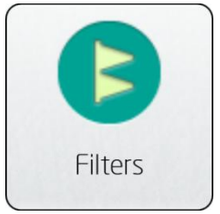


Functions/Filters:

Settings for preventive 3-months period maintenance notification, useful to organize periodical maintenance operations such as filters cleaning or replacement.

In addition, it is possible to set an alarm directly indicating that the pressure value on one flow has reached a critical threshold. This pressure drop may be due to filters fouling and therefore they should be cleaned or changed.

Functions/Filters



Functions/Filters/Periodic maintenance:

Periodic maintenance

Settings for preventive periodic maintenance notification.

- 3 months: Activate a preventive maintenance notification every 3 months.
  Hours for the limit associated to this maintenance corresponds to 3 months.
  Once the hours counter associated to this maintenance has exceeded the hours limit, a notification is generated. The hours when the unit is stopped are also counted.
  The instructions in the maintenance manual of the unit for the 3 months maintenance should be followed. Mainly, the filters should be cleaned or replaced.

- Days remaining: Days remaining before next maintenance notification

- Reset: Reset of the days counter for reaching the maintenance period.

Functions/Filters

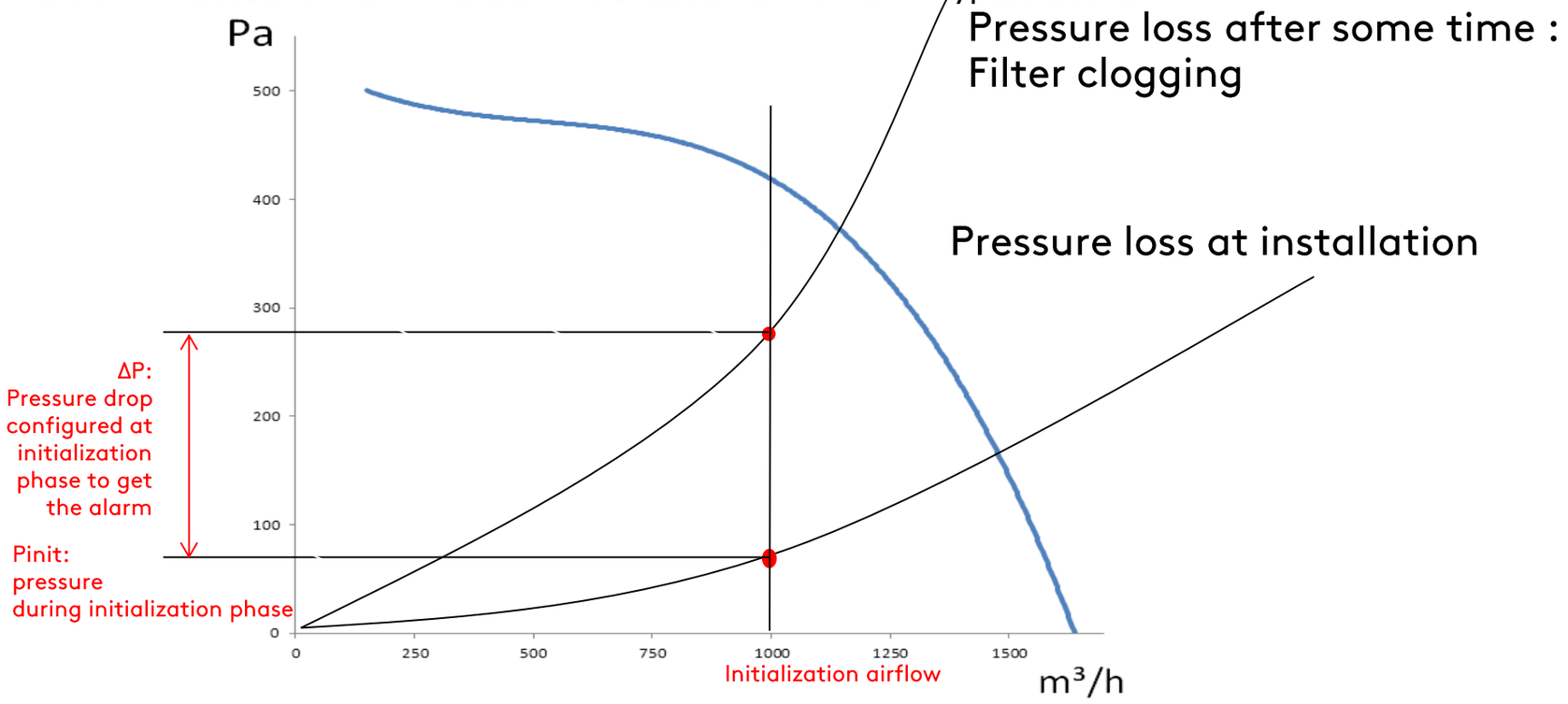
Functions/Filters/Pressure alarm:

Pressure alarm

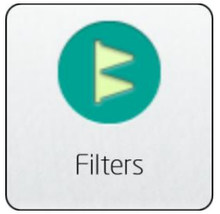
Filters

The pressure alarm is tripped when an increase in pressure compared to the reference pressure is detected. In most cases, this indicates that the filters are clogged.

No alarm if actual airflow < 40% of initialization airflow or if bypass active



Functions/Filters



Functions/Filters/Pressure alarm:

- Filter pressure monitoring with sensor: Indicate the presence of pressure sensors on each filter for their fouling monitoring. If these sensors are missing, calculated pressure alarm for filters can be used, except for constant pressure systems or systems with torque modulation.
- Pressure alarm: The pressure alarm is tripped when an increase in pressure, compared to the reference pressure, is detected. In most cases, this indicates that the filters are fouled.

N.B.: No alarm if actual airflow < 40% of initialization airflow or if bypass active.

- Computed Pressure alarm stop fan: When set, the fans will stop in case of computed pressure alarm.
- Supply Pressure Increase: Increase in pressure compared to the reference pressure from which the pressure alarm is tripped (Supply air).
- Extract Pressure Increase: Increase in pressure compared to the reference pressure from which the pressure alarm is tripped (Extract air).
- Supply air flow initialization: Nominal air flow for the supply air. This will determine the pressure setpoint.
- Reference pressure initialization: Initialization of the reference pressure used by the pressure alarm. After +/-1 minute the reference pressure is stored.

Functions/Filters

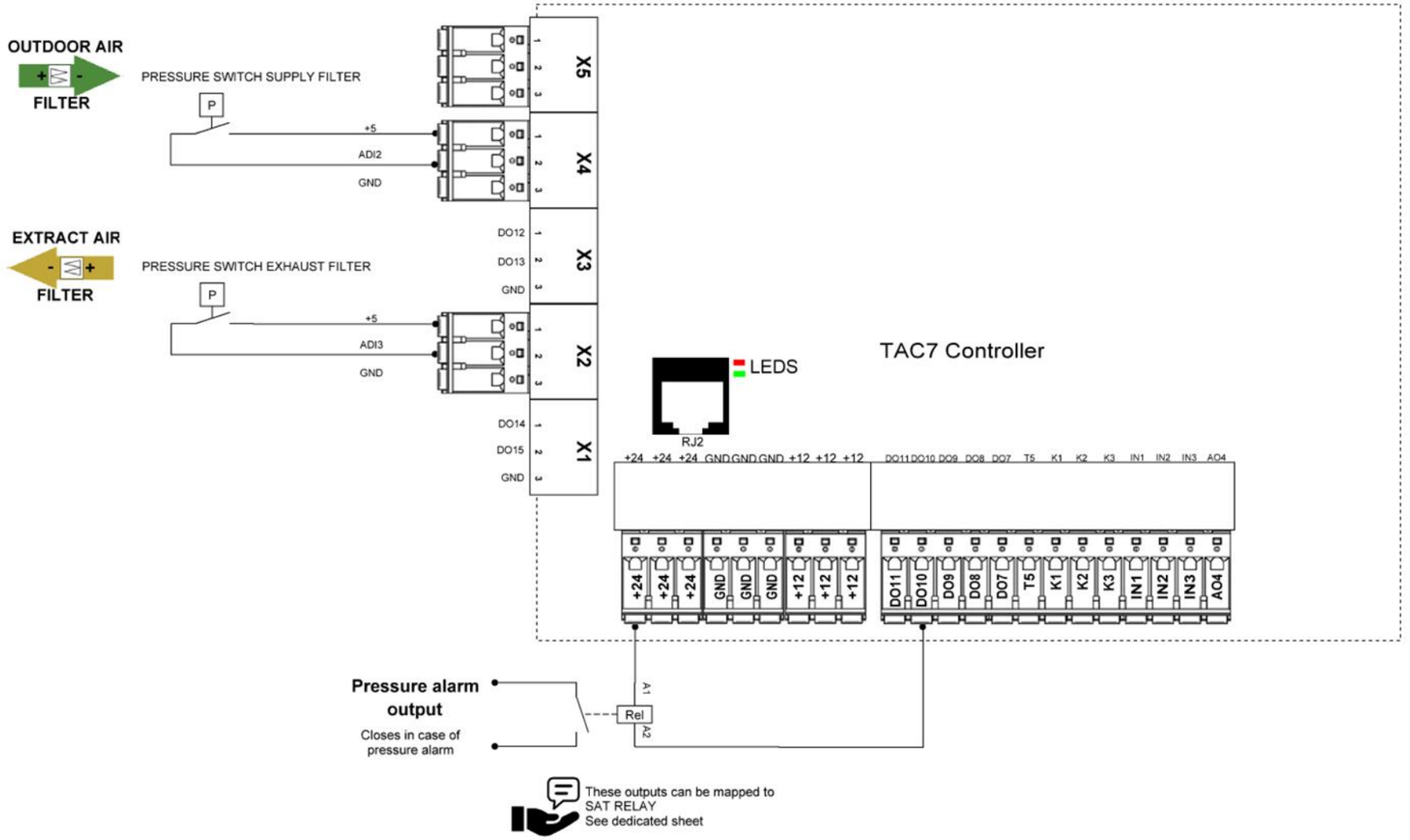
Functions/Filters/Clogging of filters:

Indication of the filter fouling level base on the pressure alarm reference and its trigger threshold.

- Fouling of the supply filter: Level of fouling for supply filter: 0-33%=green, 33-66%=orange, above 66%=red
- Fouling of the extract filter: Level of fouling for extract filter: 0-33%=green, 33-66%=orange, above 66%=red

Functions/Filters

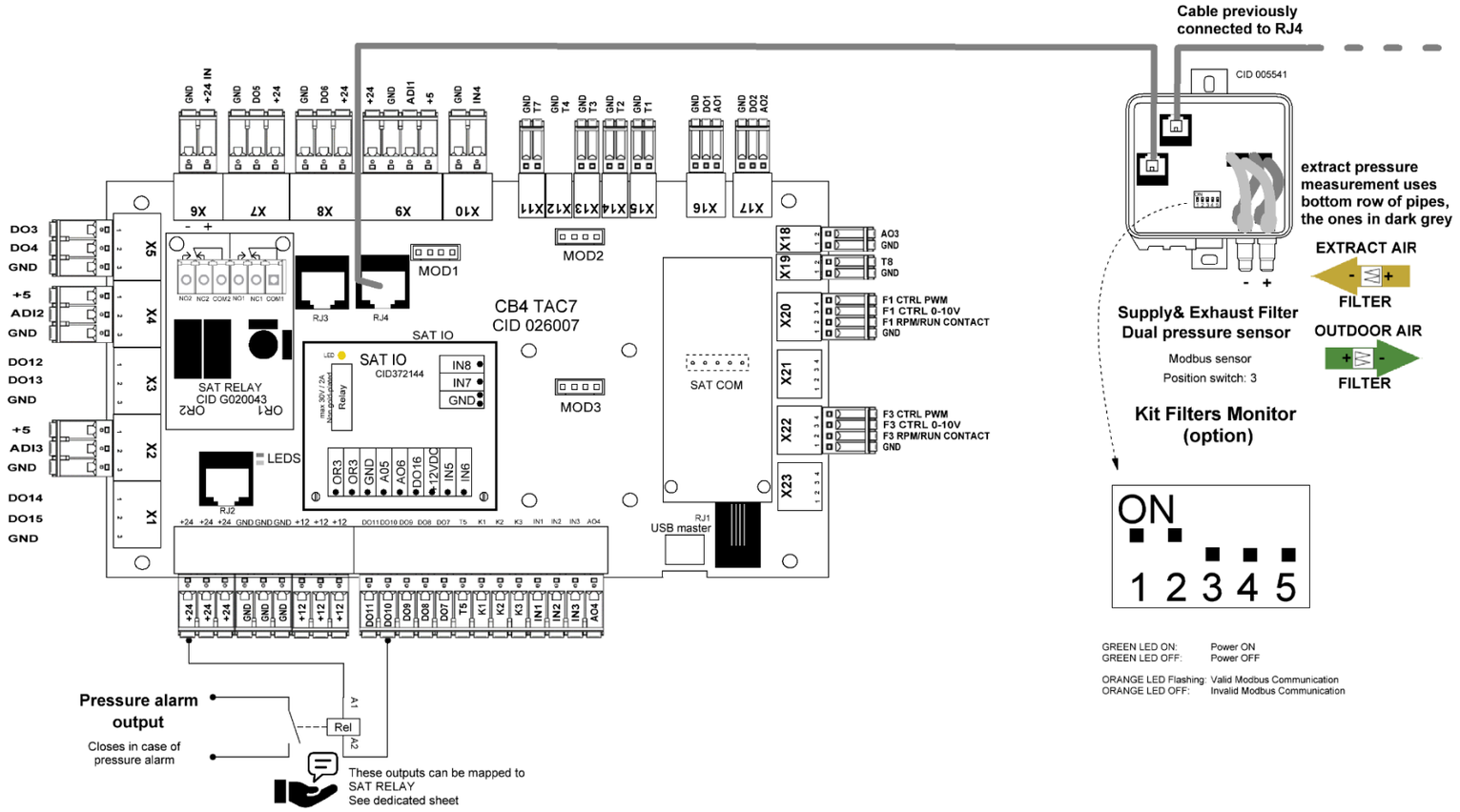
- **Wiring -** Filters alarm with pressure switch connected on ADI2/ADI3



TAC7

Functions/Filters

- **Wiring - Filters alarm and their monitoring with dual Modbus pressure sensor**



Functions/Filters/Pressure alarm/Filters pressure revelation with sensors

- **Associated information status :**

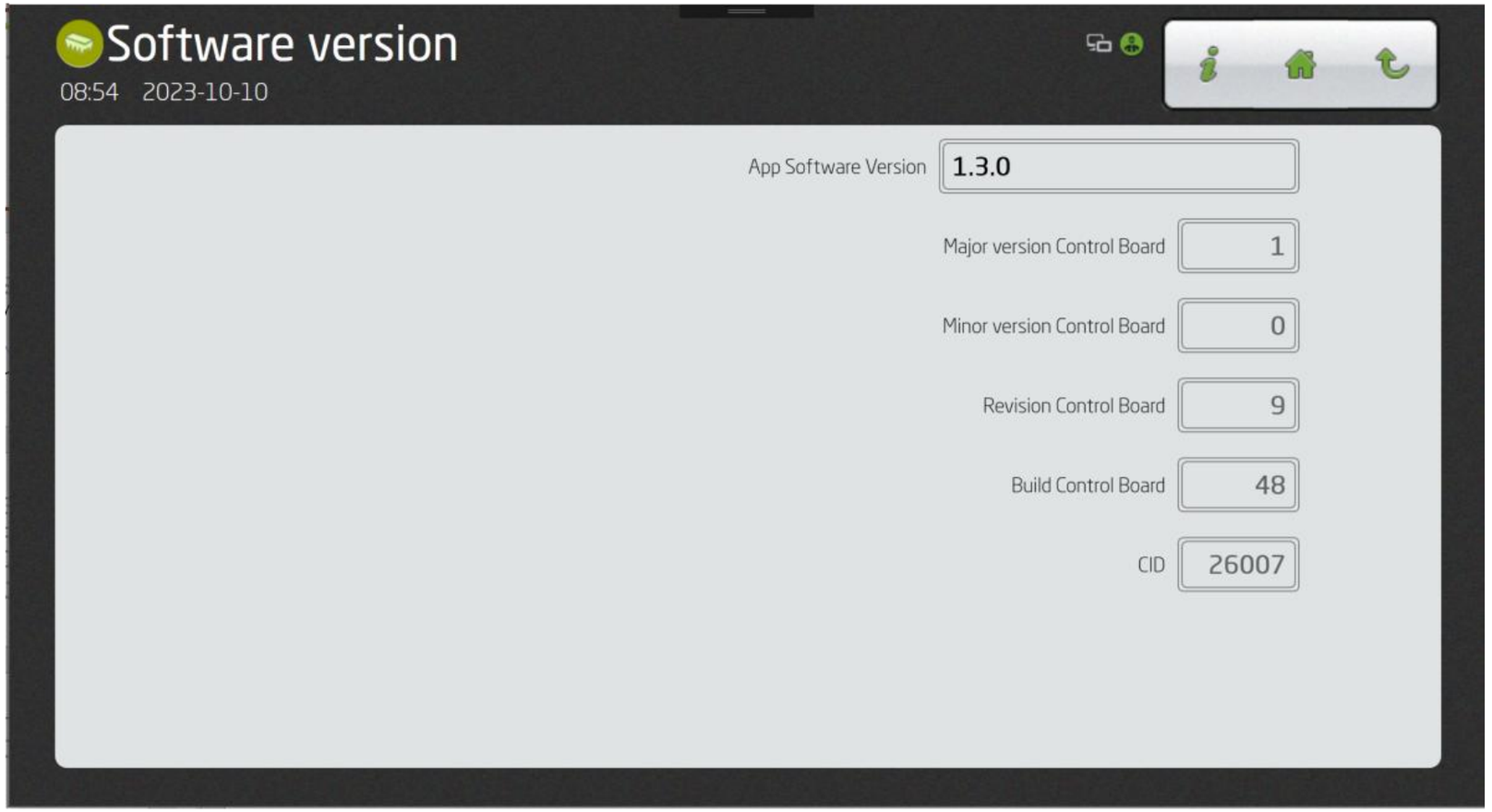
Dashboard/Process Status: Initialization of reference pressure when this one has been started.

TAC7

Functions/Software Version

Functions/Software Version:

The current program versions for the TAC control board and TACtouch hand-held terminal can be viewed and updated from SAT Modbus or micro SD card respectively.

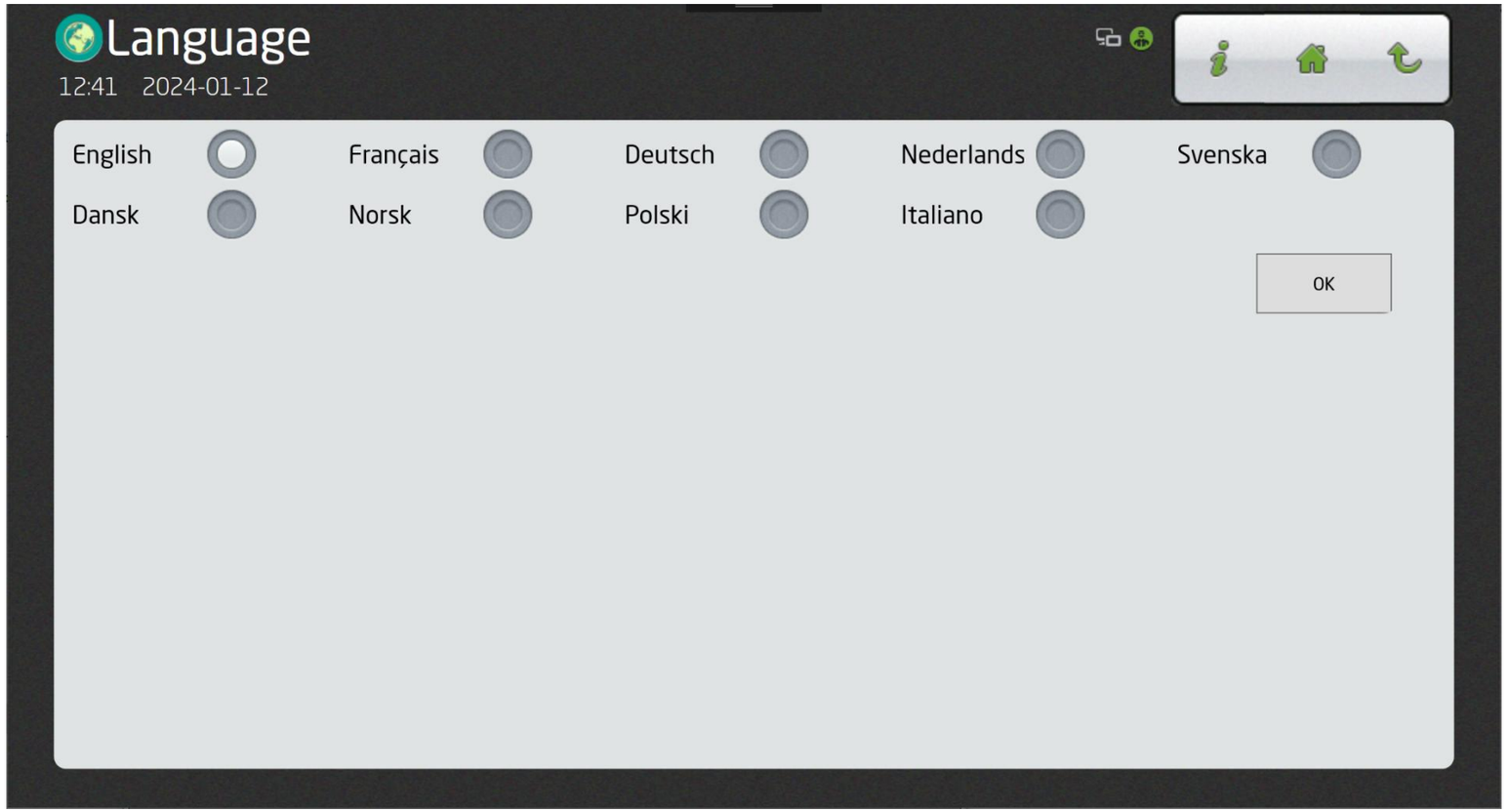


TAC7

Functions/Language

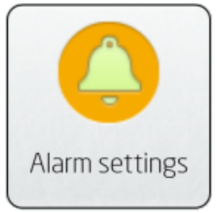
Functions/Language:

Display language TACtouch..



TAC7

Functions/Alarm Settings



Functions/Alarm Settings:

Settings to configure fire alarm, 12-months maintenance alarms, operating time and visualization of low-level alarms.

Functions/ Alarm Settings /Fire alarm:

Fire alarm

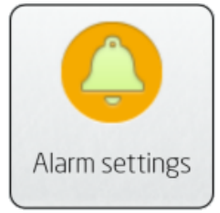
Configuration of the fire alarm settings.
- Type of switch: Type of contact connected for fire alarm input
Normally Closed (N.C.)
or
Normally Open (N.O.)
- Supply air: Supply air flow in the event of a fire alarm.
- Extract air: Extract air flow in the event of a fire alarm.
- Fire Alarm auto reset: If set, the fire alarm status will end together with the end of fire alarm and the alarm "end of fire alarm" will not be set

Functions/ Alarm Settings /Periodic maintenance - 12 months:

Periodic maintenance - 12 months

- 12 months: Activate a preventive maintenance message every 12 months.
- Days remaining before next maintenance notification

Functions/Alarm Settings



Functions/ Alarm Settings /Operating time:

Operating time

Operating time: activation, recording, configuration of hours to reach for alarm and/or fans stop.

- Operating time activation: Activation of the fans' operating time counter. After a set time, an alarm can be tripped or the fans can be stopped.
- Reset: Resetting of the operating time counter.
- Operating time alarm activation: Activation of an alarm after a certain operating time (Alarm Time).
- Operating time hours for alarm: Enter the time after which the alarm is activated.
- Operating time activation for fans stopping: Activation of the stopping of the fans after a certain time (Stop Time).
- Operating time hours for the fans to stop: Enter the time after which the fans are stopped.

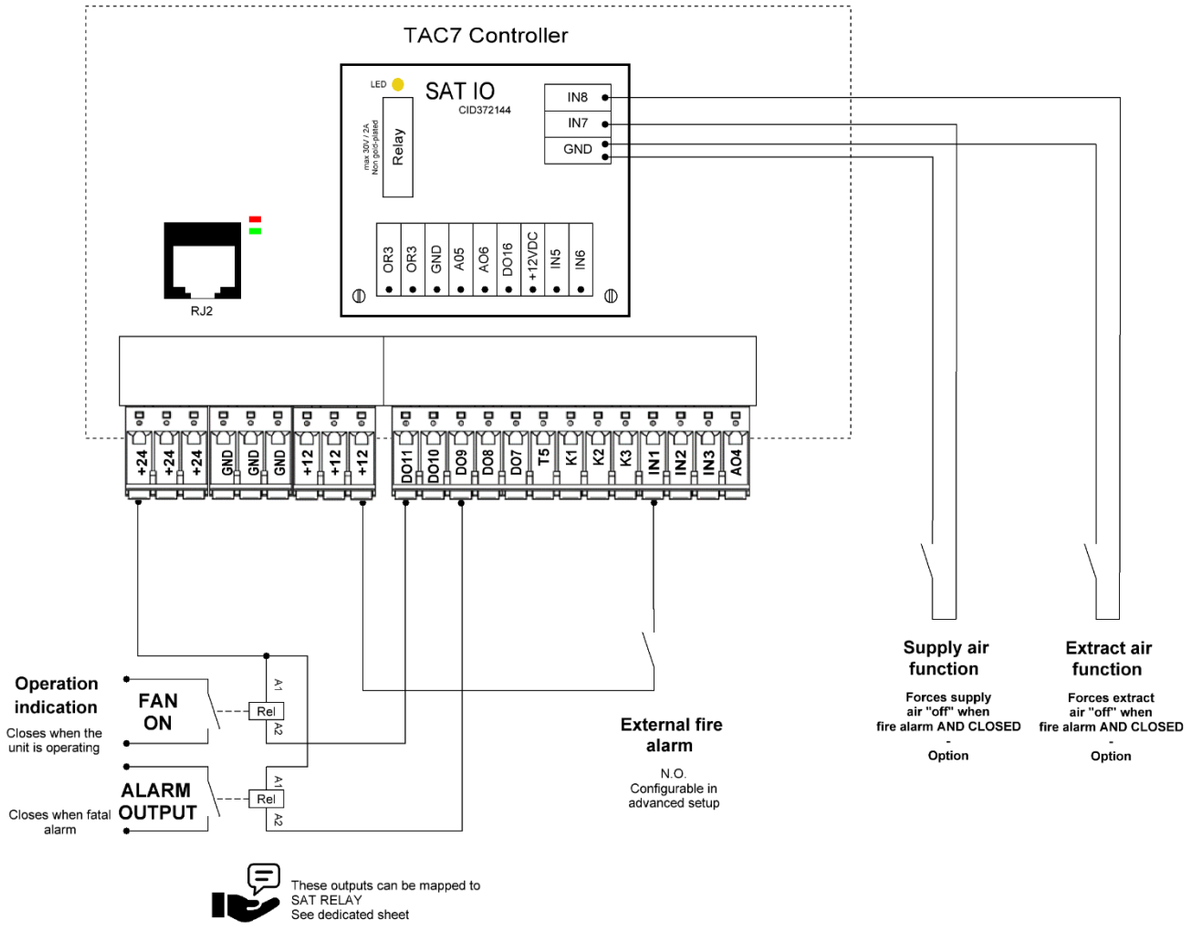
Low level alarms

Functions/ Alarm Settings /Low level alarms:

- Hide: Hide lowest level alarms

Functions/Alarm Settings

- **Wiring – Fire Alarm:**

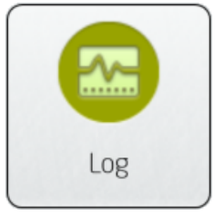


- **Associated information status :**

Dashboard/Control Status: FIRE ALARM

TAC7

Functions/Log



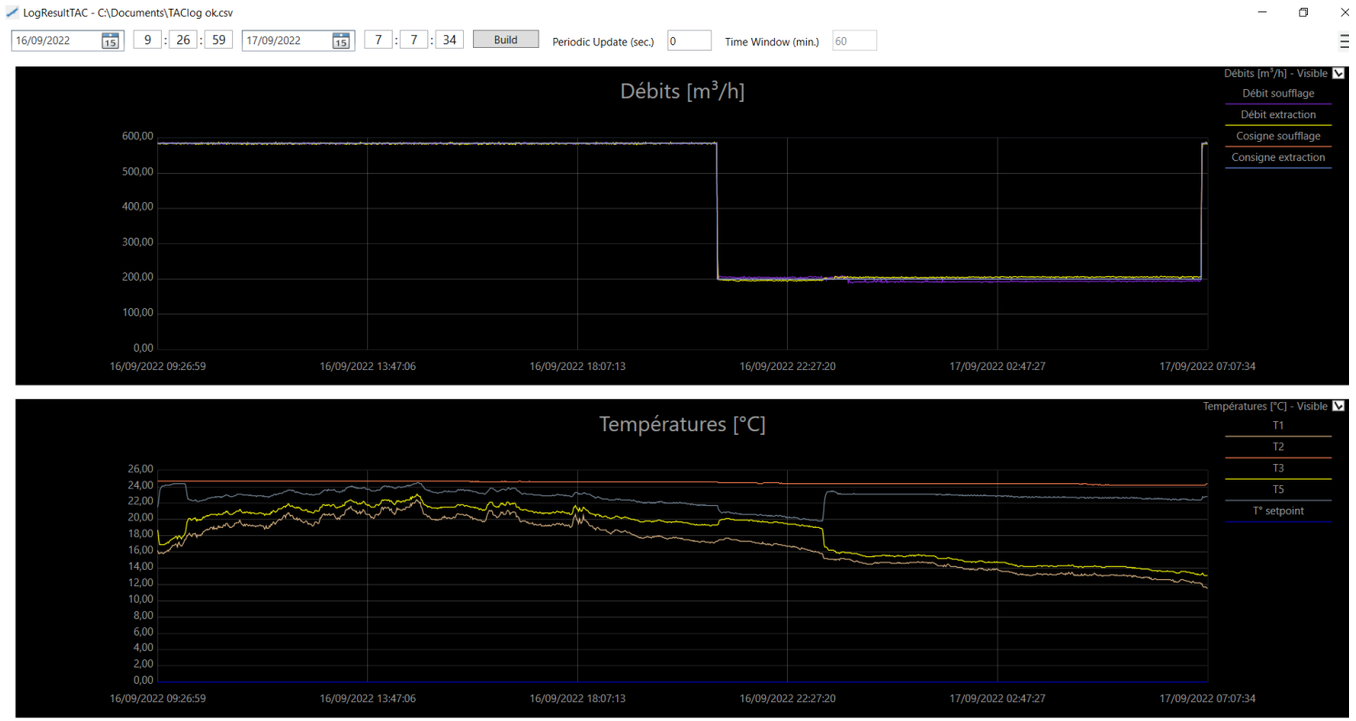
Functions/ Log:

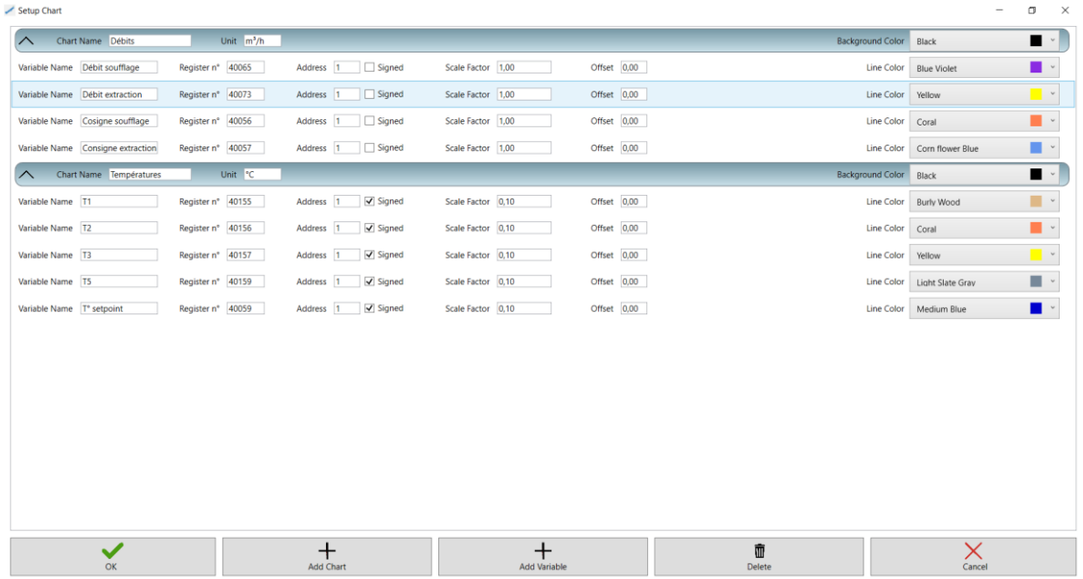
Logs status and some parameters in TXT file named TAClog. Data will be appended to the last data already written and then rolled back to beginning of file if the size of the file has reached its maximum. Before starting to log, it is recommended to save the data to have the complete configuration of the unit. These data may be analyzed thanks to LogResult software available on simulator package.

- Logging Period: Period (in seconds) for data logging
- Save Data: saves parameters and status variables to external memory if present on CSV file named “DataSaved“, which eventually will be overwritten. It is advised to archive this file and rename it with the serial number of the air handling unit.
- Write Data: writes parameters, previously saved with save commando, to the control circuit board
- Log analyzer button in Dashboard: Show a button in Dashboard to launch the software for log data analysis. Available only on simulator.

Functions/Log

- **Log report from LogResult – example:**





- **Associated information status :**

Dashboard/Button “Log Data Analyzer”: Buton will appear below the ones for alarms if parameter “Log analyzer button in Dashboard” is enabled (only on simulator).

Functions/Air Handling Unit

Functions/Air Handling Unit:

Settings to configure a specific name for the air handling unit (saved in control circuit board), change the REC type.

Functions/ Air Handling Unit /Settings:

Settings

Settings to configure a specific name for the air handling unit (saved in control circuit board), change the REC type.
- Name: Specific name of the air handling unit. It will be saved in the control circuit board and displayed on header.
- REC Type: Enter the REC TYPE of the AHU.
- AHU layout: Air flow direction: right or left.
- Fans start-up delay: Delay to wait before to start the fans when they are commanded to start from stop status

Functions/ Air Handling Unit /Damper:

Damper

Select YES if there is a damper at the air inlet. This function will activate the start-up delay.
- Damper: Select YES if there are motorized dampers. This function will activate the start-up delay.
- Damper opening time: Opening time of motorized dampers

- **Associated information status :**

Header: model name and specific name; Dashboard/Synoptic: left or right air flows layout.

Functions/Heat

Functions/Heat:

Status monitoring and settings for internal electric preheater (KWin), external waterborne preheater (EBAin), external electric preheater (Cold Climate Preheater), for internal/external waterborne reheater (IBA, EBA), for internal/external electric reheater (KWout, KWext), for external heat pump.

Functions/Heat/Status:

All the relevant values can be read here. Used for performance Checks

Status

Functions/Heat/Cold Climate Preheater

Cold Climate Preheater

See details in dedicated section.

Functions/Heat/Pre-heat

Pre-heat

Optional preheater is used for antifreeze of the plate heat exchanger. Its power is modulated to keep exhaust temperature above anti-freeze threshold temperature (1°C by default). See Function Heat Recovery/Antifreeze for more details. Select Kwin if there is an internal electrical preheater installed, or EBAin in case of external waterborne preheater.

See details in dedicated section for Kwin and EBAin.

Functions/Heat

Functions/Heat/Re-heat

Re-heat

Re-heat

Select the installed reheater type.
Select one or more installed reheater type with cascade possibility: electrical (internal KWout or external KWext), waterborne (internal IBA or external EBA) or heat pump (external).
Modulation of heating power to reach desired comfort temperature set point and measured on sensor defined in Functions/Temperature/Regulation mode (Supply temperature by default, can be also the extract air temperature).

Interaction between reheating and cooling when both are present:
Automatic changeover: only 1 setpoint for heating/cooling: COMFORT temperature setpoint
Manual changeover: 2 setpoints that may differ for heating/cooling and selection of heating/cooling: via contact, communication or HMI.
Forced heating power off: by HMI/communication or contacts (heating allowed by default).
Heating automatically disabled if the fans are OFF or if bypass activated.

Reheating/cooling with waterborne coil:
Regulation of the opening of a 3 ways valve to reduce the gap between setpoint and actual value. The speed of the regulation is configurable. At fans start-up, before that fan status is ON, the valve is commanded at 50% opening, if in heat mode.
Circulator pump activation contact
Antifrost protection of the coil through the opening of the valve when the temperature on the coil is below a threshold.
Generated alarms: Type 10 - Alarm indicating waterborne coils anti-frosting alert

Functions/Heat

Functions/Heat/Re-heat

reheating with electrical battery:
Regulation of the power sent to the battery through the command of solid-state relay with PWM signal (configurable period) or 0-10V controlled module. The regulation is a PID type one, and the parameters gain, time derivative and time integrative are configurable.

reheating with Heat Pump:
Regulation of the power sent to reheating/cooling with Heat Pump through modulation of 0-10V output signal.
Enabling output contact.
Defrost input contact. In case of Defrost, fans will run at dedicated low/reduced speed unless another reheater is present, in that case, it will be activated for the duration of the defrost of the Heat pump.

Indication output contact for Heat available.

See details in dedicated section for KWout, IBA, KWext, EBA, HP.

Functions/Heat

Functions/Heat/Post-ventilation

Post-ventilation

Post-ventilation settings (the fans continue to run for a period of time after switching off).

- Activation of postventilation: Activation of the postventilation (the fans continue to run for a period of time after switching off). If electric Pre-heating and/or reheating is installed, the postventilation is activated and cannot be deactivated.

Season Heat

Select the periods of the year for which the reheating is deactivated.

Post-ventilation

Season Heat

- **Associated information status:**

  Dashboard/Process Status: Heating/Postventilation active

Functions/Heat/Cold Climate Preheater

Cold Climate Preheater

Functions/Heat/Cold Climate Preheater

Cold Climate Preheater

The Cold Climate Preheater, supported on PX/RX units, will keep the temperature measured by T1 (outdoor air temperature) at a configurable setpoint defined as parameter Cold Climate Preheater Setpoint (default value: -9°C, range [-29;1]), when fans are operating.

All antifrost option can still be used (supply air flow reduction, Kwin, bypass modulation) excepted EBAin (external waterborne preheater, not requiring this CCP).

The physical external coil is electrical, controlled with 0-10V signal (AO2) or PWM (DO12).

Post-ventilation parameter is NOT forced to be set unlike for other electrical batteries, but can still be set.

Dedicated advanced PID parameters for control loop.

When fans are operating, if T1 falls under Cold Climate Preheater Setpoint minus a configurable tolerance (default value 0,5°, range [0,2; 5] for more than a configurable time (range [0; 15 minutes]) , then a critical alarm for CCP failure is activated , provided the time is longer than 0.

Functions/Heat/Cold Climate Preheater

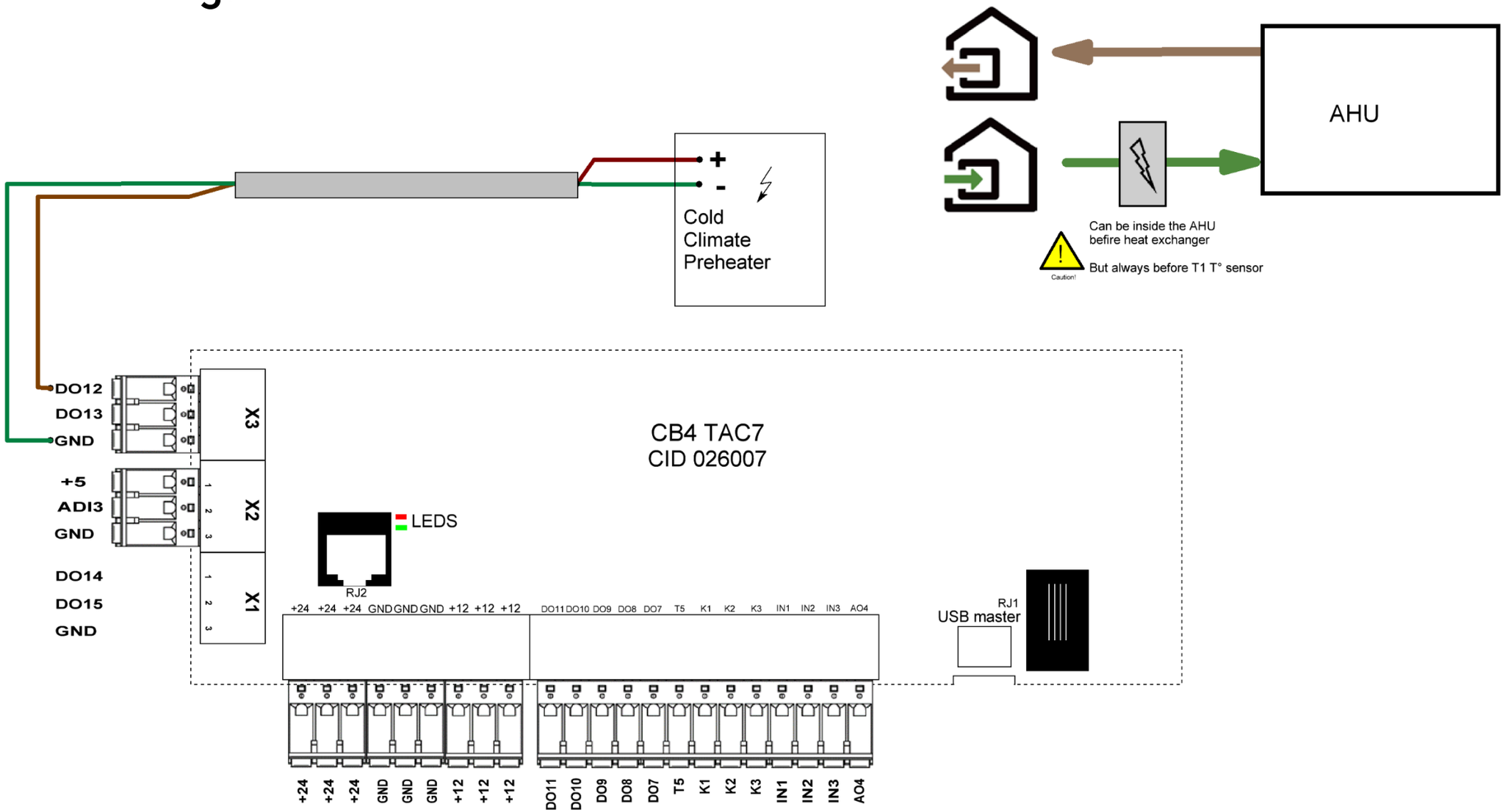
Cold Climate Preheater

Functions/Heat/Cold Climate Preheater

- Type: Type of cold climate preheater: 0 = NONE; 1=0-10V controlled; 2 =PWM controlled
- Temperature setpoint: temperature setpoint for the cold climate preheater compared with outdoor air temperature to keep its temperature above
- Extra delta temperature at start-up: Extra delta temperature at start up to add to temperature setpoint for the cold climate preheater. Applied for dedicated time or until that the fan status is ON.
- Time for extra delta temperature at start-up: Time during which the delta temperature at start-up is applied
- Start-up time limit: Timeout for Cold Climate Preheater after which critical alarm is sent if T1 does not reach setpoint
- Temperature tolerance: Tolerance for the temperature setpoint of the Cold Climate Preheater when fans are ON. When T1 falls below dedicated setpoint minus this tolerance for more than the set time, a critical alarm is triggered.
- Out of tolerance temperature timeout: Time during which the outdoor air temperature can be lower than the setpoint minus the tolerance when fans are operating. After this time, if greater than 0, a critical alarm is triggered.
- PWM period: PWM period for Cold Climate Preheater. If 0, works as ON/OFF
- PID settings: Activation of the option of changing the PID settings. IMPORTANT: only change these settings if you are authorized to do so.

Functions/Heat/Cold Climate Preheater

- **Wiring:**



TAC7

Functions/Heat/Pre-heat - KWin

Pre-heat

Functions/Heat/Pre-heat

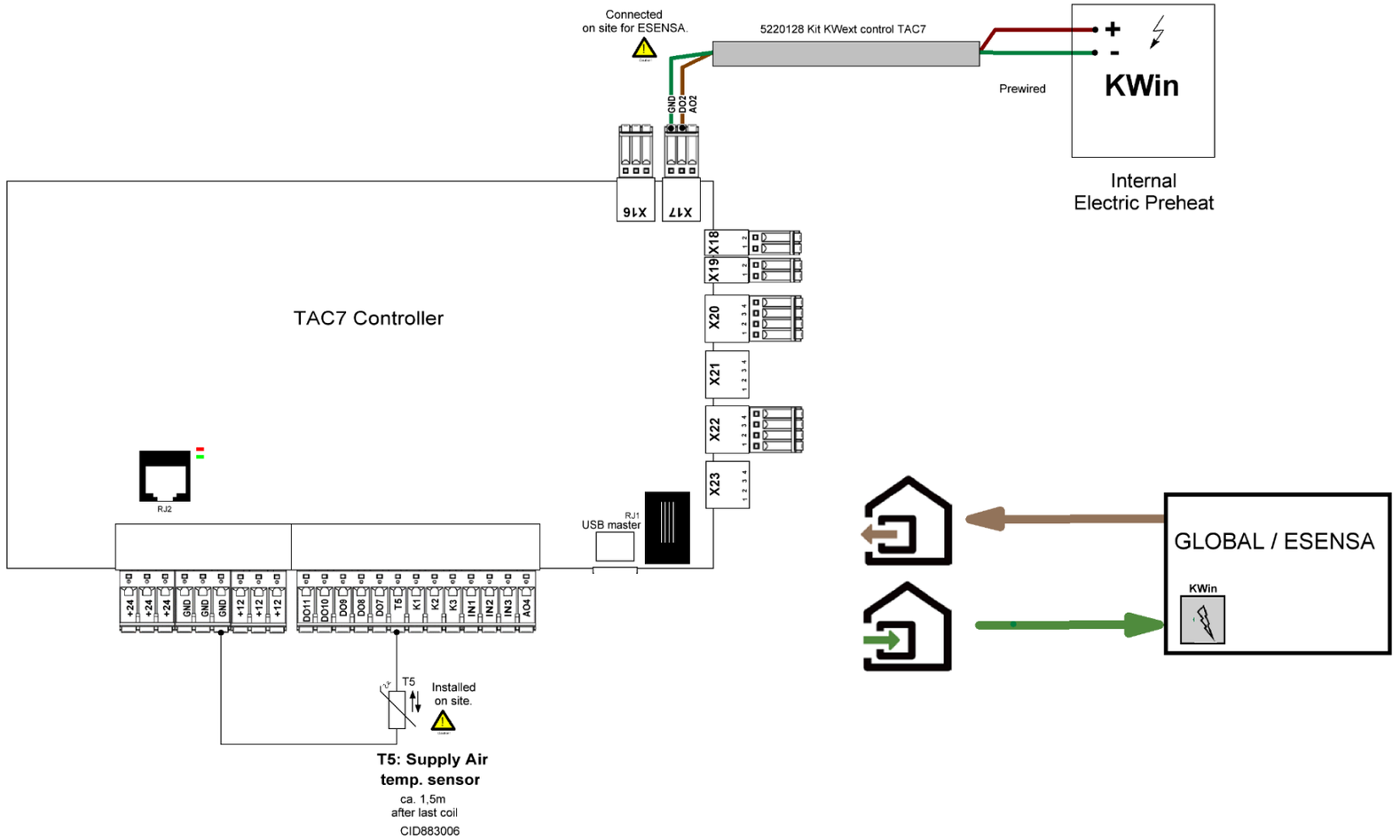
Pre-heat

Optional preheater is used for antifreeze strategy of the plate heat exchanger. Its power is modulated to keep exhaust temperature above anti-freeze threshold temperature (1°C by default). See Function Heat Recovery/Antifreeze for more details. Select Kwin if there is an internal electrical reheater installed, or EBAin in case of external waterborne preheater.

- Electrical preheater (KWin): electric preheater. None or KWin
- PID settings: Activation of the option of changing the PID settings.
  IMPORTANT: only change these settings if you are authorized to do so.
- Proportional: Change the proportional setting.
- Integral: Change the integral setting.
- Derivative: Change the derivative setting.

Functions/Heat/Pre-heat - KWin

- **Wiring (prewired on GLOBAL):**



- **Associated information status :**

Dashboard/Process Status: Antifreeze when Kwin is active

TAC7

Functions/Heat/Pre-heat - EBAin

Pre-heat

Functions/Heat/Pre-heat

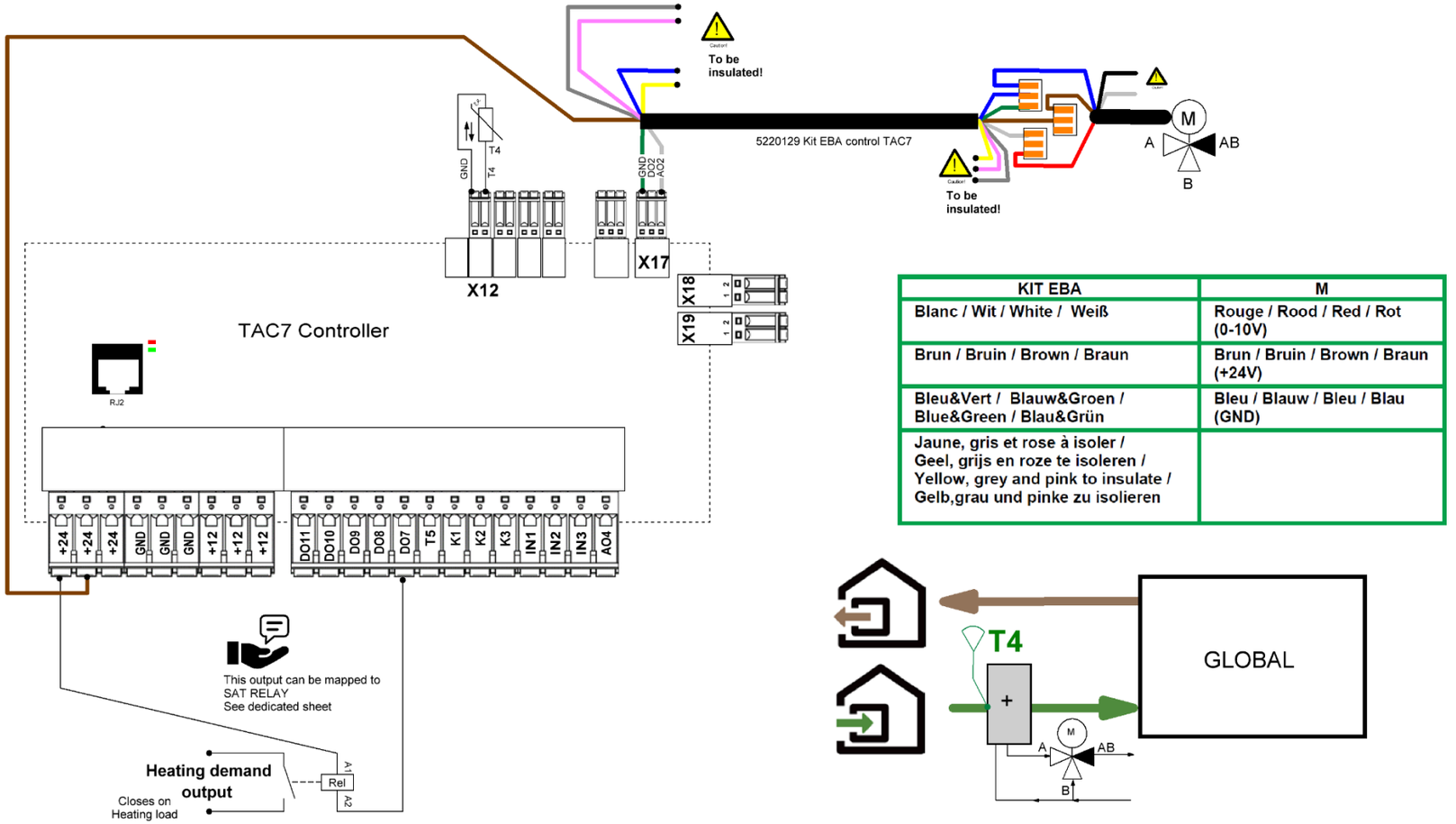
Pre-heat

Optional preheater is used for antifreeze strategy of the plate heat exchanger. Its power is modulated to keep exhaust temperature above anti-freeze threshold temperature (1°C by default). See Function Heat Recovery/Antifreeze for more details. Select Kwin if there is an internal electrical reheater installed, or EBAin in case of external waterborne preheater.

- External waterborne preheater (EBAin): external waterborne preheater. NONE or EBAin
- Regulation speed: Regulation speed of the 3-ways valve. Default speed=T. Slower regulation for the high values, faster regulation for the lower values. Only change this value if there is a temperature stability problem.
- Anti-freeze temperature: temperature setpoint for starting the anti-freeze protection cycle. In case of water as fluid, 4°C recommended for sensor in the air flow, 12°C for the contact sensor. It is highly recommended to use fluid with lower freezing temperature than water, glycol for example, then this temperature may be reduced according to the fluid freeze characteristic.

Functions/Heat/Pre-heat - EBAin

- **Wiring:**



KIT EBA	M
Blanc / Wit / White / Weiß	Rouge / Rood / Red / Rot (0-10V)
Brun / Bruin / Brown / Braun	Brun / Bruin / Brown / Braun (+24V)
Bleu&Vert / Blauw&Groen / Blue&Green / Blau&Grün	Bleu / Blauw / Bleu / Blau (GND)
Jaune, gris et rose à isoler / Geel, grijs en roze te isoleren / Yellow, grey and pink to insulate / Gelb,grau und pinke zu isolieren	

- **Associated information status :**

Dashboard/Process Status: Antifreeze when EBAin is active

TAC7

Functions/Heat/Re-heat - KWout

Functions/Heat/Re-heat

- Electric reheater: electric reheating coil. 0= NONE;1=PWM(modulating, internal); 2=0-10V (modulating, internal);3=PWM(modulating, external); 4=0-10V (modulating, external)

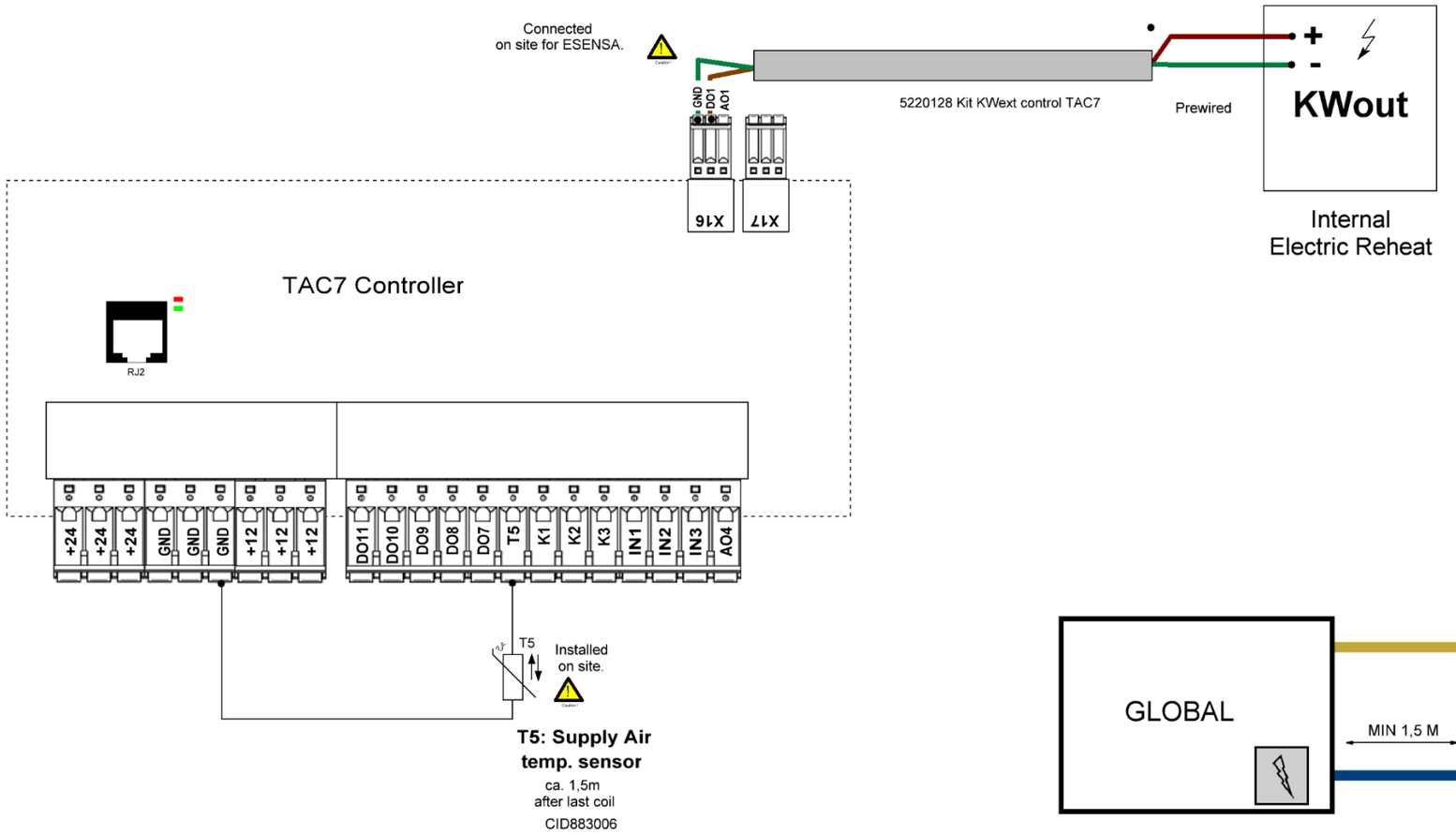
Select Internal PWM (modulating, internal) for KWout

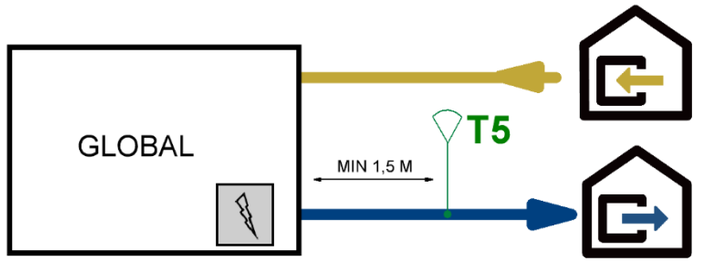
- PID settings: Activation of the option of changing the PID settings. IMPORTANT: only change these settings if you are authorized to do so.
- Proportional: Change the proportional setting.
- Integral: Change the integral setting.
- Derivative: Change the derivative setting.

- Electric reheater First to start cascade: In case of presence of another reheater, the level of the postheater in the cascade is indicated: first or next. Next is default, reheaters with same levels start in parallel, so at least one of them must have been set with level first to create a cascade.

Functions/Heat/Re-heat - KWout

- **Wiring:**





- **Associated information status :**

Dashboard/Process Status: Heating when KWout is active

TAC7

Functions/Heat/Re-heat - IBA

Re-heat

Functions/Heat/Re-heat

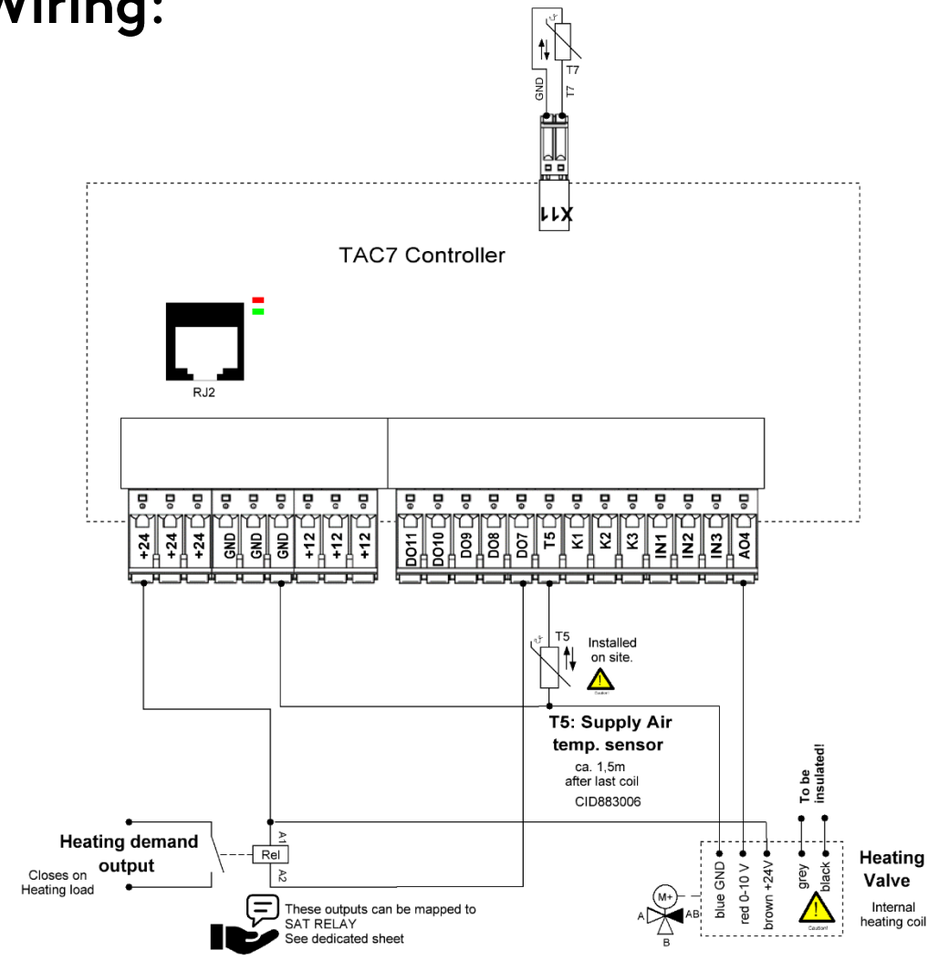
- Waterborne reheater: waterborne reheater. 0= NONE; 1=INTERNAL (IBA); 2=EXTERNAL (EBA).

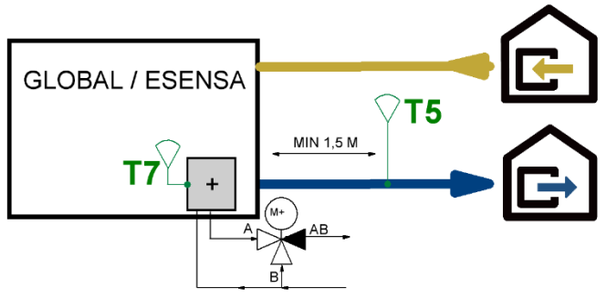
Select INTERNAL (IBA) for IBA

- Anti-freeze temperature: temperature setpoint for starting the anti-freeze protection cycle. 4°C recommended for sensor in the air flow, 12°C for the contact sensor.
- Regulation speed: Regulation speed of the 3-ways valve. Default speed=T. Slower regulation for the high values, faster regulation for the lower values. Only change this value if there is a temperature stability problem.
- Waterborne reheater First to start cascade: In case of presence of another reheater, indicates the level of the reheater in the cascade: first or next (default). reheaters with same levels start in parallel, so at least one of them must have been set with level first to create a cascade.

Functions/Heat/Re-heat - IBA

- **Wiring:**





- **Associated information status :**

Dashboard/Process Status: Heating when IBA is active

TAC7

Functions/Heat/Re-heat - KWext

Re-heat

Functions/Heat/Re-heat

- Electric reheater: Presence of electric reheating coil. 0= NONE;1=PWM(modulating, internal); 2=0-10V (modulating, internal);3=PWM(modulating, external); 4=0-10V (modulating, external)

Select 0-10V External for KWext

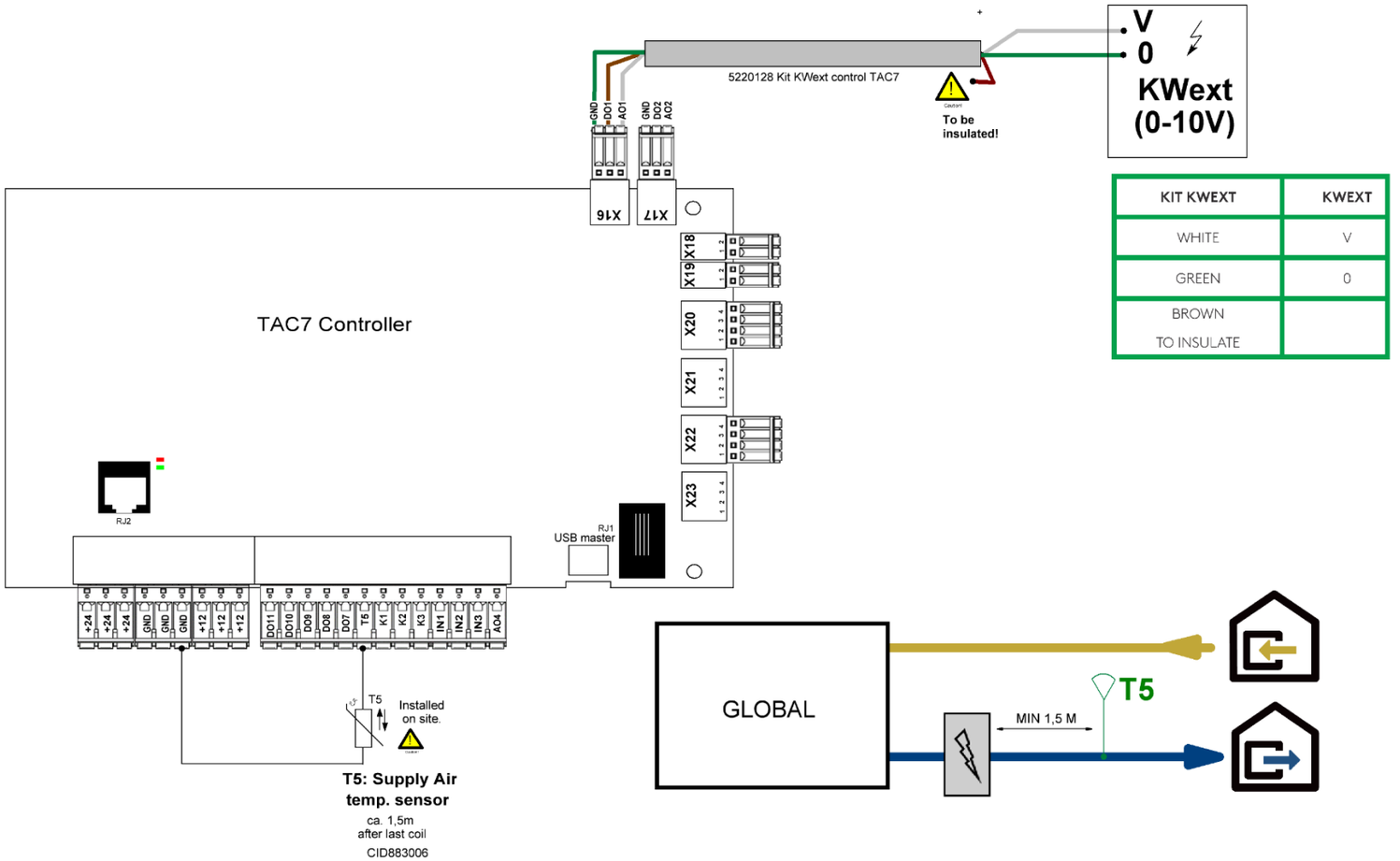
- PID settings: Activation of the option of changing the PID settings. IMPORTANT: only change these settings if you are authorized to do so.
- PWM period for external electric reheater. If 0, works as ON/OFF: Duty cycle of the electric air heater
- Electric reheater First to start cascade: In case of presence of another reheater, indicates the level of the reheater in the cascade: first or next (default). reheaters with same levels start in parallel, so at least one of them must have been set with level first to create a cascade.

- **Associated information status :**

  Dashboard/Process Status: Heating when KWout is active

Functions/Heat/Re-heat - KWext

- **Wiring:**



- **Associated information status :**

Dashboard/Process Status: Heating when KWext is active

TAC7

Functions/Heat/Re-heat – EBA+

Re-heat

Functions/Heat/Re-heat

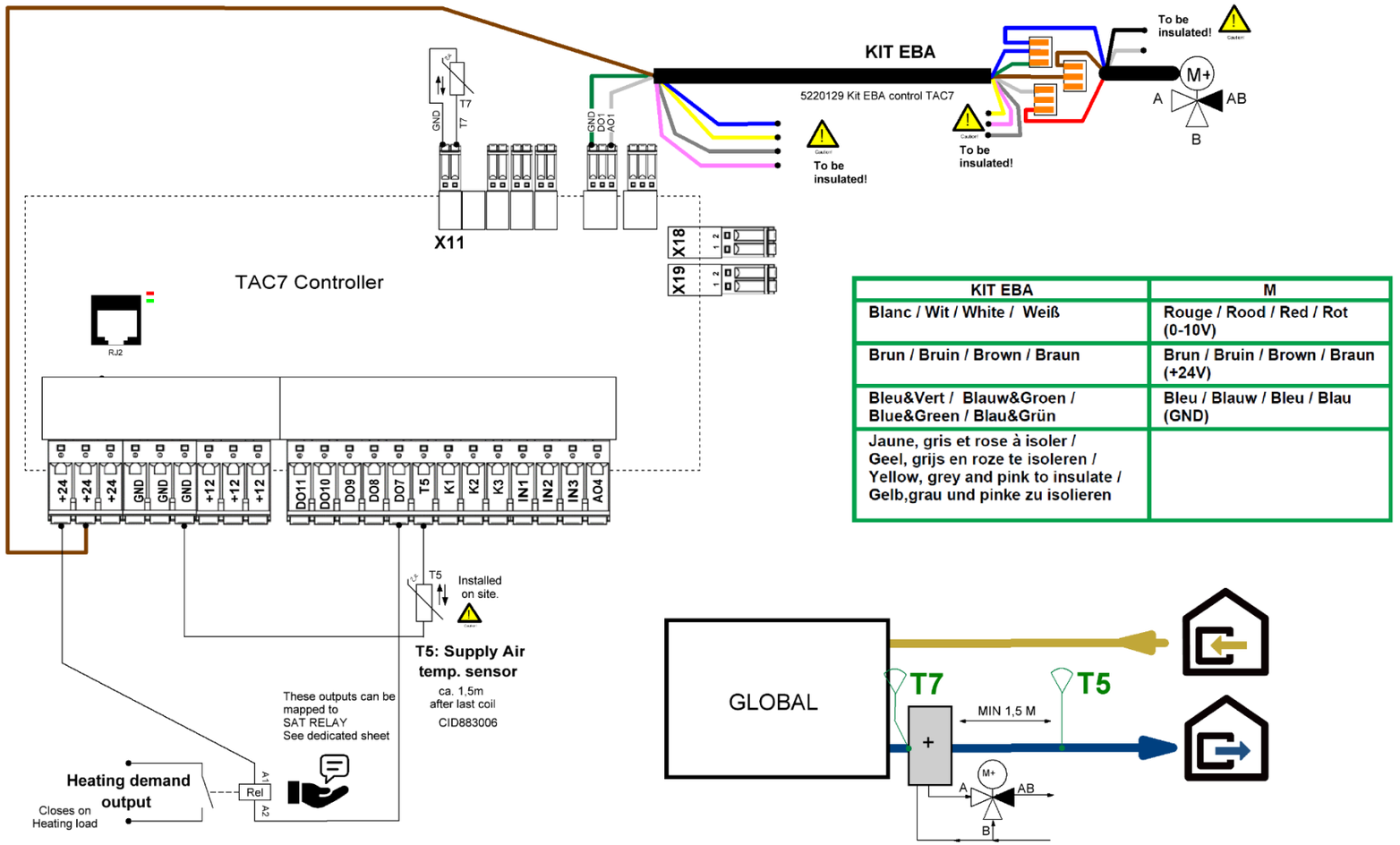
- Waterborne reheater: Presence of waterborne reheater. 0= NONE; 1=INTERNAL (IBA); 2=EXTERNAL (EBA).

Select EXTERNAL (EBA) for EBA+

- Anti-freeze temperature: temperature setpoint for starting the anti-freeze protection cycle. 4°C recommended for sensor in the air flow, 12°C for the contact sensor.
- Regulation speed: Regulation speed of the 3-ways valve. Default speed=T. Slower regulation for the high values, faster regulation for the lower values. Only change this value if there is a temperature stability problem.
- Waterborne reheater First to start cascade: In case of presence of another reheater, indicates the level of the reheater in the cascade: first or next (default). reheaters with same levels start in parallel, so at least one of them must have been set with level first to create a cascade.

Functions/Heat/Re-heat – EBA+

- **Wiring:**



KIT EBA	M
Blanc / Wit / White / Weiß	Rouge / Rood / Red / Rot (0-10V)
Brun / Bruin / Brown / Braun	Brun / Bruin / Brown / Braun (+24V)
Bleu&Vert / Blauw&Groen / Blue&Green / Blau&Grün	Bleu / Blauw / Bleu / Blau (GND)
Jaune, gris et rose à isoler / Geel, grijs en roze te isoleren / Yellow, grey and pink to insulate / Gelb,grau und pinke zu isolieren	

- **Associated information status :**

Dashboard/Process Status: Heating when EBA+ is active

TAC7

Functions/Heat/Re-heat – Heat Pump

Functions/Heat/Re-heat

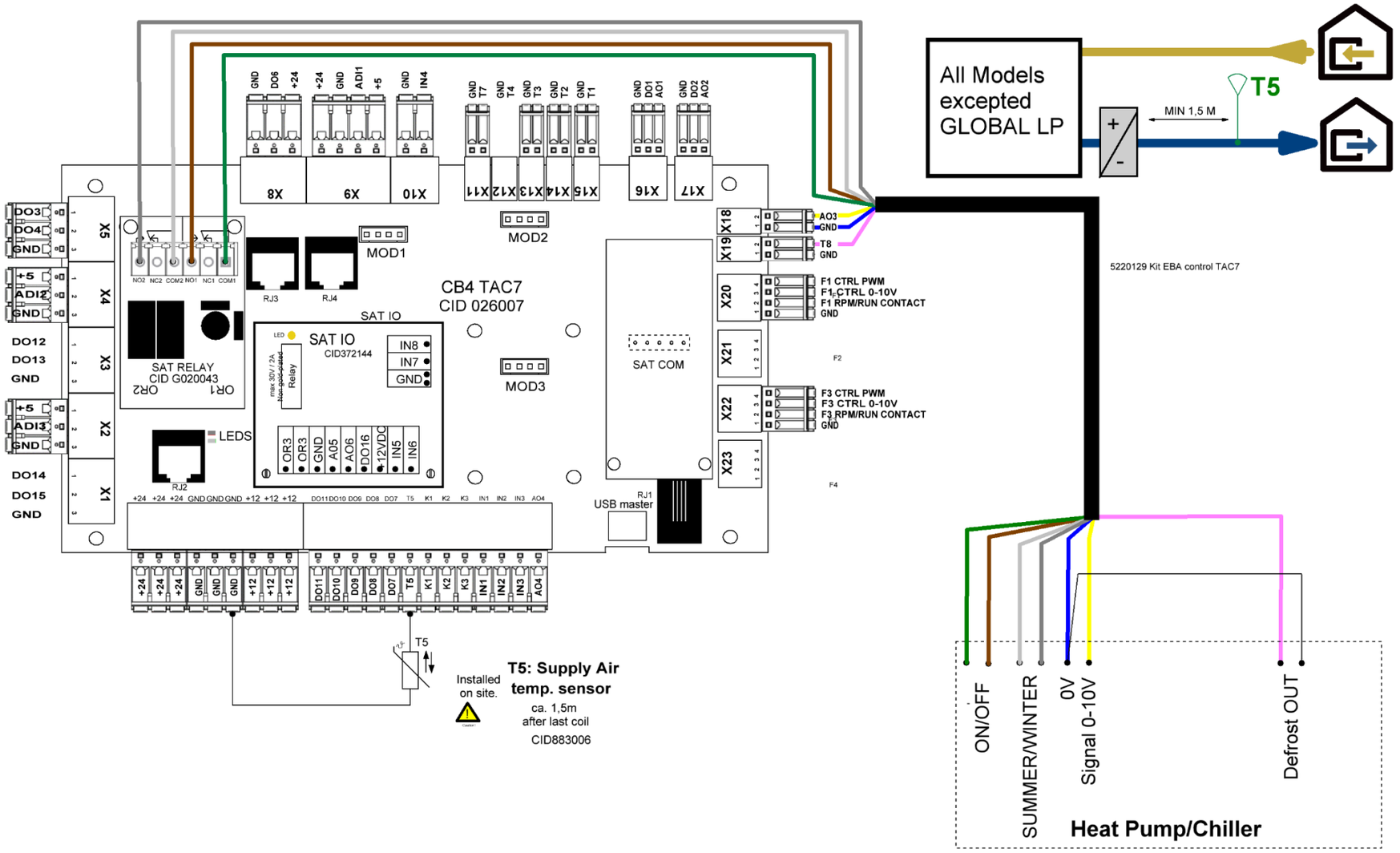
- Heat pump: heat pump: NONE or PRESENT.

Select Present for Heat Pump

- Regulation speed: Regulation speed of regulation algorithm (1 slow, 10 fast) for heat pump
- Heat pump First to start cascade: In case of presence of another reheater, indicates the level of the reheater in the cascade: first or next (default). reheaters with same levels start in parallel, so at least one of them must have been set with level first to create a cascade.

Functions/Heat/Re-heat – Heat Pump

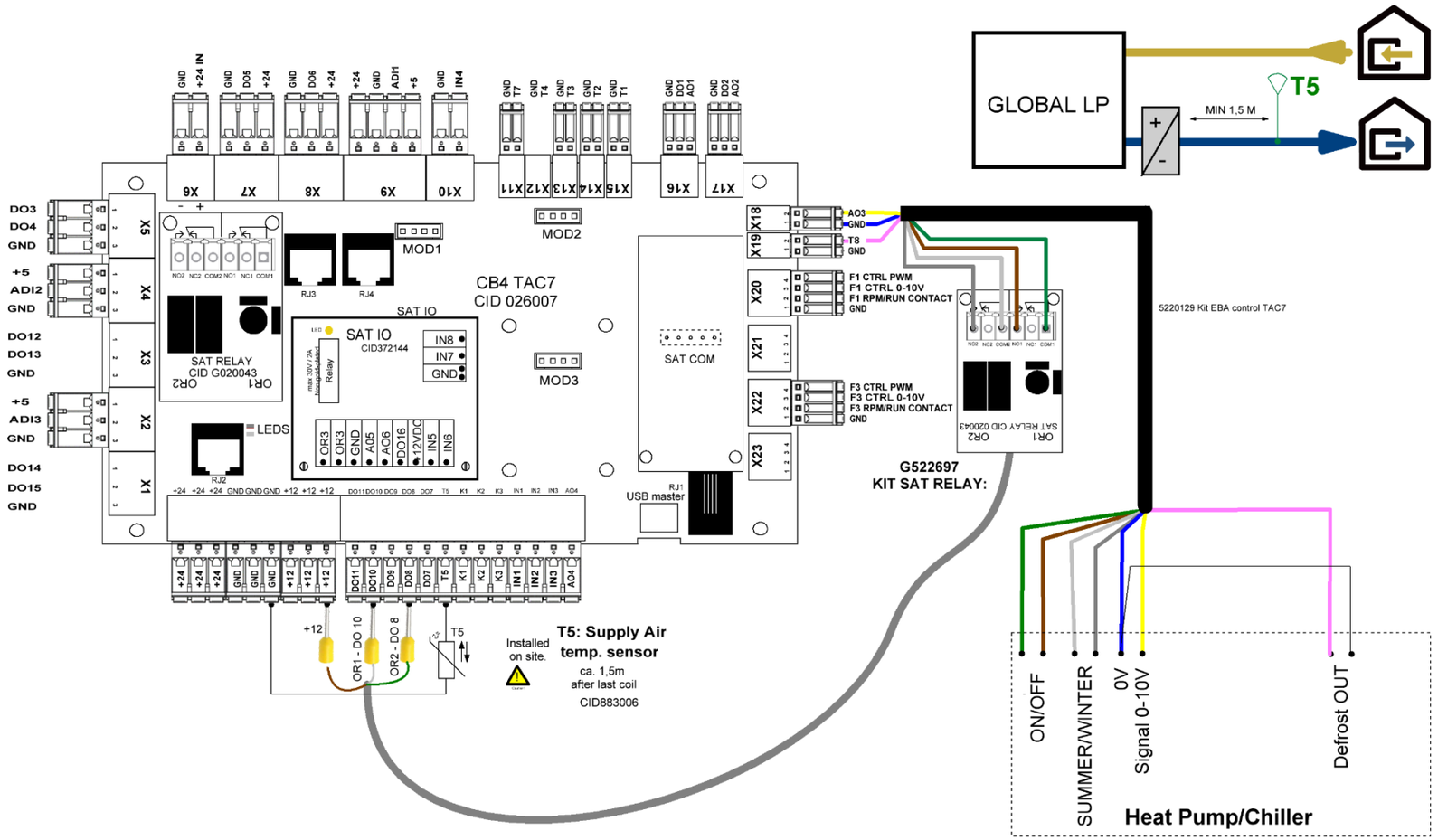
- **Wiring – All models excepted GLOBAL LP:**



TAC7

Functions/Heat/Re-heat – Heat Pump

- **Wiring – GLOBAL LP ONLY:**



- **Associated information status :**

Dashboard/Process Status: Heating when heat pump is active

TAC7

Functions/Cool

Functions/Cool:

Status monitoring and settings for external waterborne air cooler (EBA-) or for chiller.

Functions/Cool/Status:

Status

All the relevant values can be read here. Used for performance checks.

Functions/Cool/Settings :

Settings

- recooling: Select the type of air cooler
- Regulation speed: Regulation speed of the 3-ways valve. Default speed=T. Slower regulation for the high values, faster regulation for the lower values. Only change this value if there is a temperature stability problem.
- Anti-freeze temperature: temperature setpoint for starting the anti-freeze protection cycle. 4°C recommended for sensor in the air flow, 12°C for the contact sensor.
- Chiller: Chiller: NONE or PRESENT. When set to PRESENT, the none/present parameter is reset for the: heat pump and chiller, waterborne recooler and combi-coil.
- Regulation speed: Regulation speed of regulation algorithm for heat pump/chiller or only chiller. Default speed=T. Slower regulation for the high values, faster regulation for the lower values. Only change this value if there is a temperature stability problem.

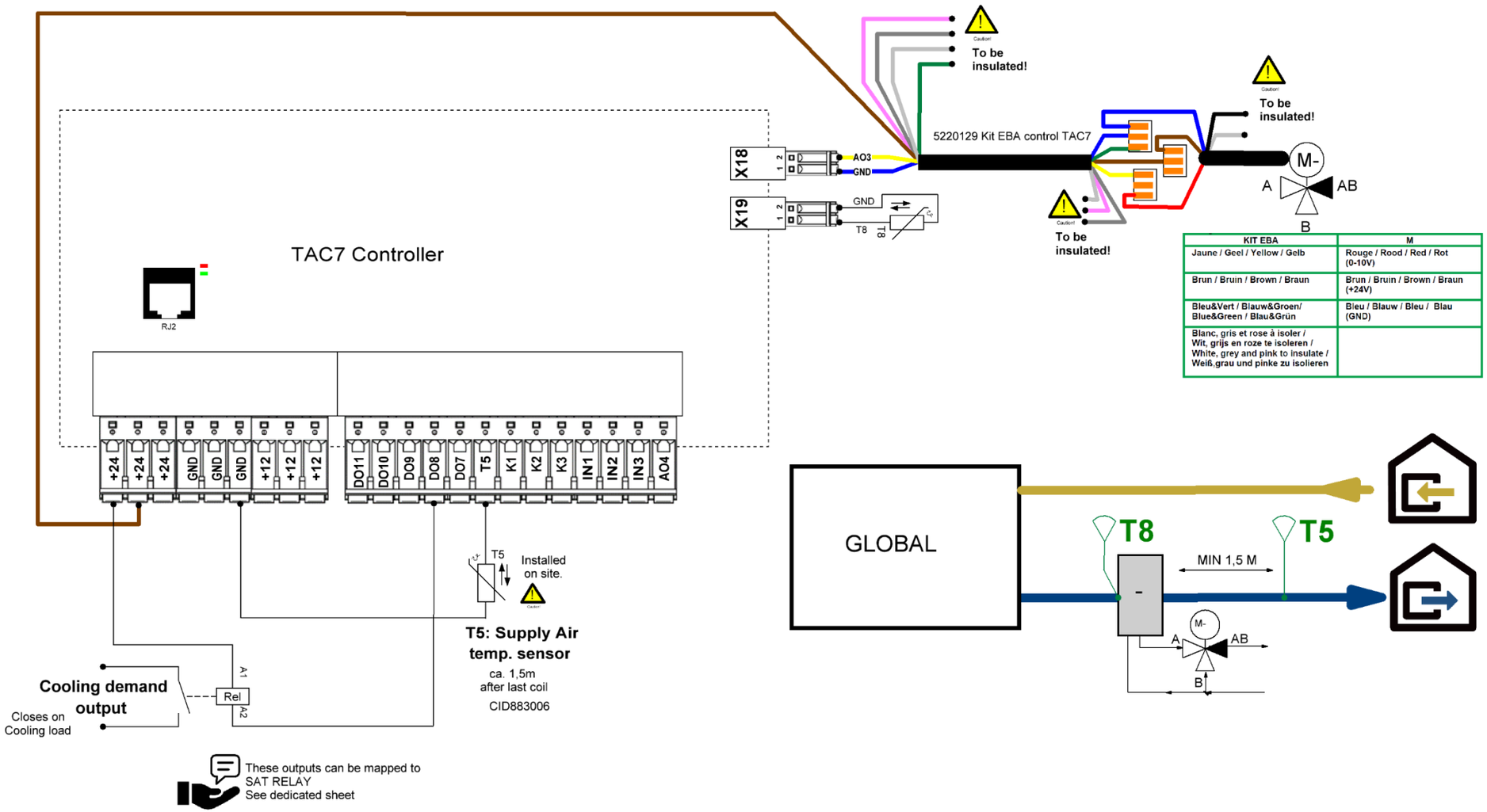
Season management

Functions/Cool/Season management

Select the periods of the year for which the recooling is deactivated.

Functions/Cool

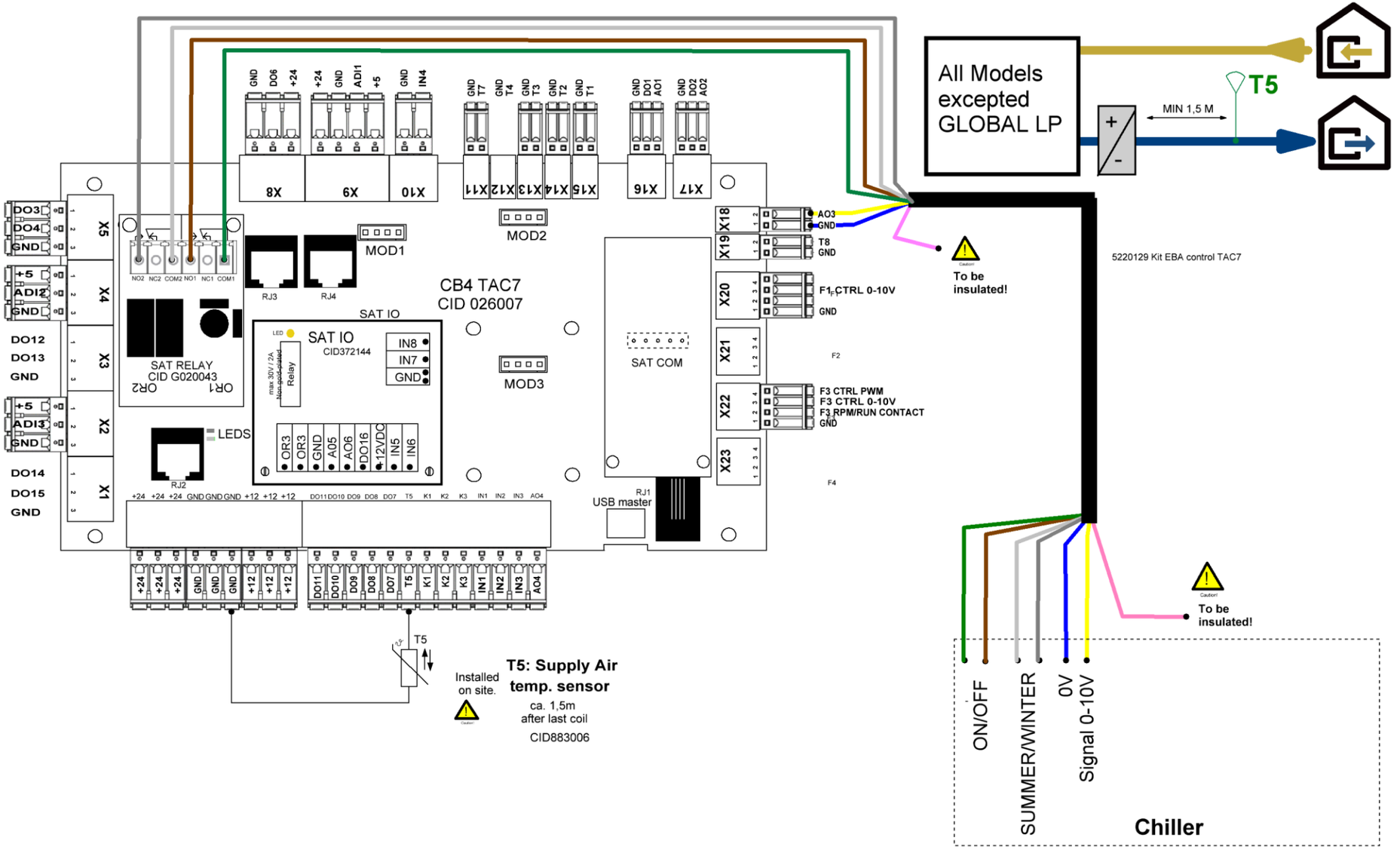
- **Wiring – external waterborne recooler EBA-:**



TAC7

Functions/Cool

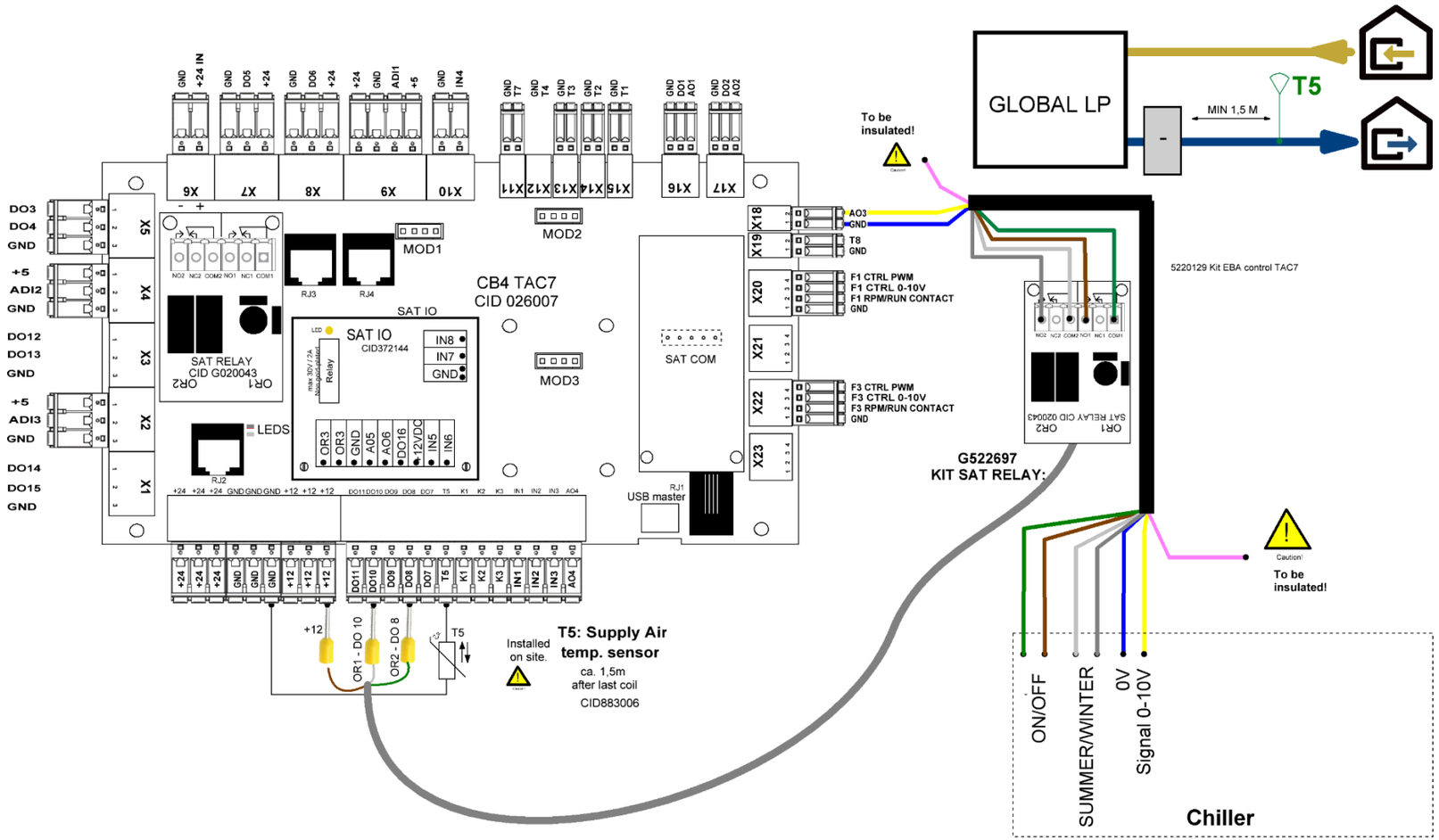
- **Wiring – Chiller on all models excepted GLOBAL LP:**



TAC7

Functions/Cool

- **Wiring – Chiller on GLOBAL LP ONLY:**



- **Associated information status :**

Dashboard/Process Status: Cooling when EBA- or Chiller is active.

TAC7

Functions/Heat / cool recovery

Functions/Heat / cool recovery:

Settings related to heat exchanger, its antifrost protection and its bypass management

Functions/ Heat / cool recovery /Status:

All the relevant values can be read here. Used for performance Checks

Status

Functions/ Heat / cool recovery /Anti-freeze

Anti-freeze

See details in dedicated section for each type of anti-freeze protection and for defrost detection/process.

- Supply temperature limit for Defrost: Lower limit of the supply temperature: when this temperature stays below this limit for more than 5 minutes, then the defrost process of the heat exchanger will start. Minimum is 0°C.

- Defrost pressure sensor: Select YES if a pressure sensor is installed for the defrost detection.

Functions/Heat / cool recovery

Settings

Functions/ Heat / cool recovery /Settings

On PX exchanger:

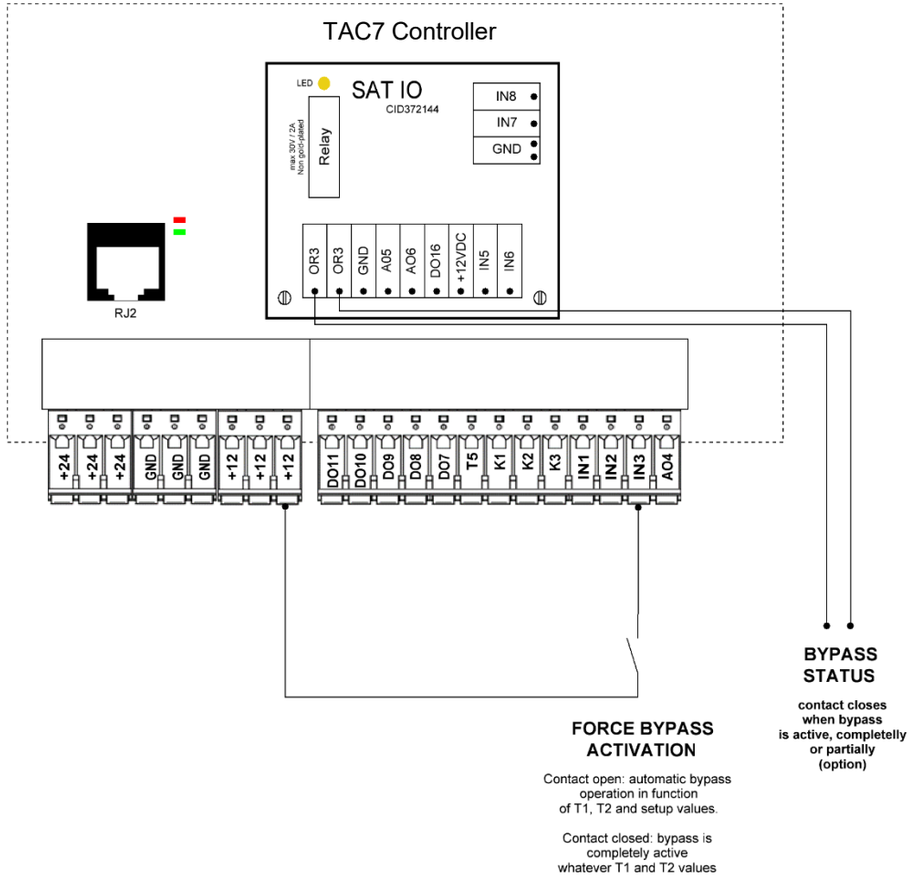
- Delta temperature minus for cooling setpoint: Delta of temperature to withdraw from the cooling temperature setpoint when the bypass is activated
- Enable delay after heating: Delay after that heating power is off and before enabling bypass.
- Input for drain pump: Indicates the presence of an input used for the monitoring of the drain pan level and its pump
- Season management - Bypass OFF: Select the periods of the year for which the bypass of the heat exchanger is deactivated.

On RX exchanger:

- Nominal rotor speed: Nominal speed of rotor in RPM
- Rotor speed at 10V: Enter the rotor speed in RPM when control signal 10V are applied
- Season management - Bypass OFF: Select the periods of the year for which the bypass of the heat exchanger is deactivated.

Functions/Heat / cool recovery

- **Wiring related to bypass activation:**



- **Associated information :**

Dashboard/Process Status: BYPASS if bypass of the heat exchanger is activated. Antifreeze/Defrost during these process.

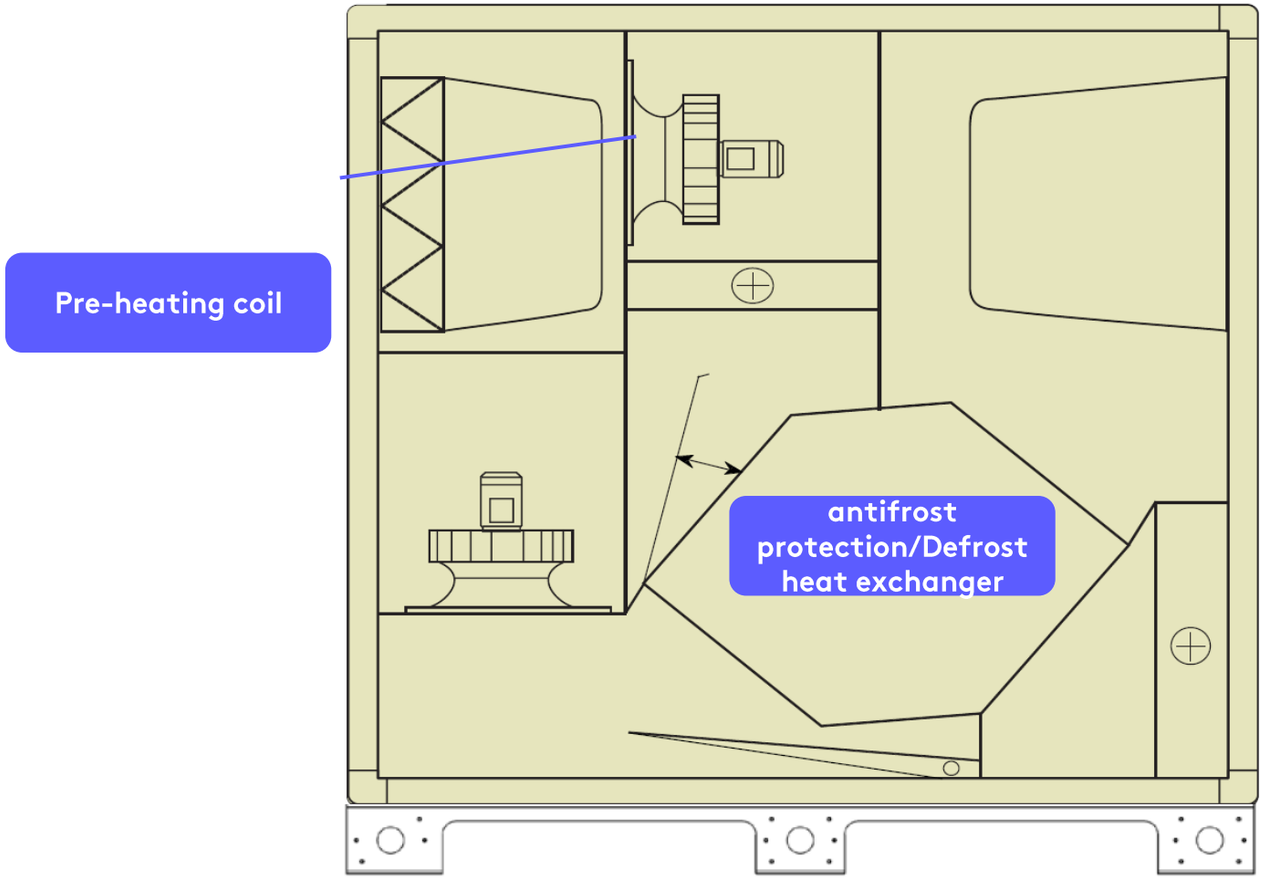
TAC7

Functions/ Heat / cool recovery /Anti-freeze

Heat / cool recovery

Anti-freeze: Prevention of the risk for the heat exchanger to frost that would damage it

Defrost: Elimination of ice formed on the heat exchanger



TAC7

Functions/ Heat / cool recovery /Anti-freeze

Antifrost Protection Strategies:

For rotary heat exchanger: reduction of the rotating speed of the rotor
For counter flow heat exchanger:
Supply Airflow reduction
Use of an internal electrical preheater (KWin option)
Use of an external waterborne preheater (EBAin option)
For units equipped with modulating bypass (all GLOBAL/ESENSA models): modulation of the opening of the modulating bypass

Functions/ Heat / cool recovery /Anti-freeze

- **Description - Anti-freeze: see dedicated section for each type of protection**
- **Description - Defrost:**
  - The ice detection, when outdoor temperature (T1) is lower than 0°C, is based on
    - a Modbus pressure sensor on the heat exchanger: the defrost process will begin when the pressure drop on the heat exchanger in the exhaust flow has reached a predetermined threshold for more than 3 minutes. Can work only with airflow modulation of the fans speed, not with torque modulation.

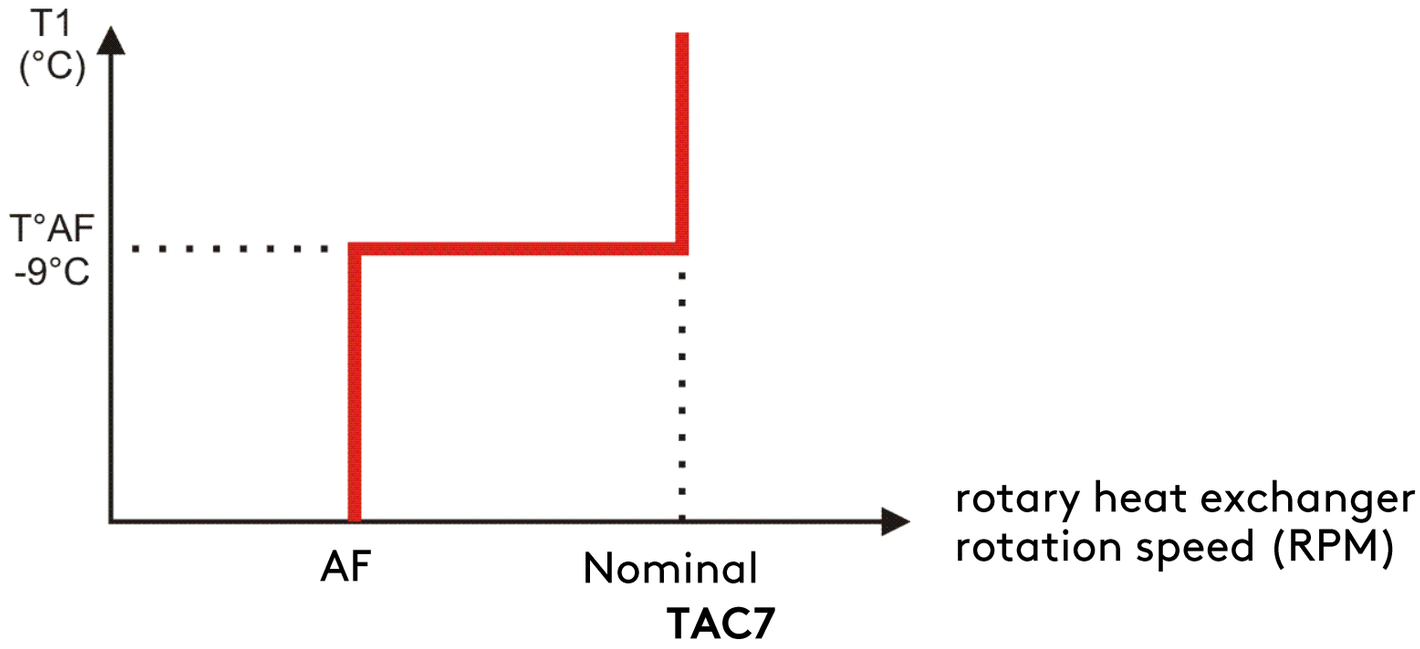
      Generated alarms: Type 21: Alarm indicating communication error for one of the Modbus pressure sensor
    - Or, when the pressure sensor is not available, the monitoring of the supply temperature after the reheater (T5): the defrost process will begin when T5 drops under 11°C for more than 5 minutes.
  - Process: The supply flow is stopped and the exhaust flow stays at its current level.
    - After 30 minutes, the exhaust flow will be stopped too for 5 minutes for draining the water formed by the melted ice.
    - Then after, the defrost process is excited and if there is a preheater, it is controlled to 100% of power and the flows reach their nominal setpoints, starting from 30%, by regular steps.
  - Generated alarms: Type 11 – Alarm indicating that the defrost process is active
- **Associated information status:** **TAC7**

Functions/ Heat / cool recovery /Anti-freeze - RX RPM reduced

- **Description:**

  when the temperature of fresh incoming air T1 falls under the configured setpoint temperature for antifrost protection, the rotation speed of the rotor will change to the setup antifrost rotation speed. When T1 will stay greater that the antifrost setpoint temperature for more than 5 minutes, the rotation speed will be turn back to its nominal value.

  Generated alarms: Type 12 - Alarm indicating heat exchanger anti-frosting alert



TAC7

Functions/ Heat / cool recovery /Anti-freeze - RX RPM reduced

- **Setup:**

Functions/ Heat / cool recovery /Anti-freeze

- Anti-freeze enabled: Enabling of the Anti-freeze protection of the rotary heat exchanger

- Anti-freeze temperature: Enter the temperature setpoint for starting the anti-freeze protection cycle by reducing the speed of rotation of the rotary exchanger.

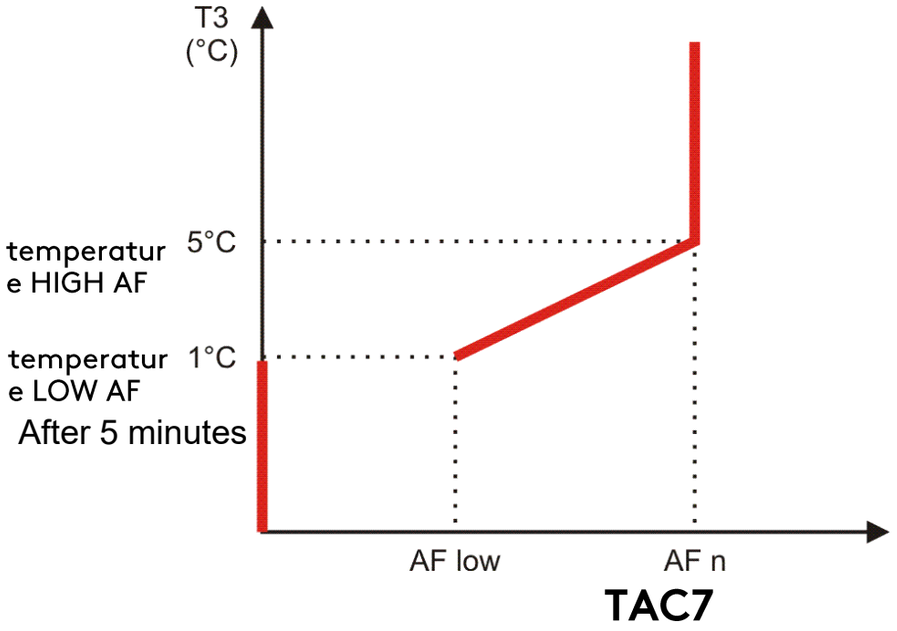
- Speed of rotation: Enter the heat exchanger rpm when the anti-freeze function is active.

- Supply temperature limit for Defrost: Lower limit of the supply temperature: when this temperature stays below this limit for more than 5 minutes, then the defrost process of the heat exchanger will start. Minimum is 0°C.

Functions/ Heat / cool recovery /Anti-freeze - Supply flow reduced

- **Description:**

antifrost protection of the heat exchanger by supply airflow reduction: after the temperature of exhaust air at the exchanger output (T3) becomes lower than 5°C, the setpoint for the supply airflow is reduced in a linear way from 100% to 33% (CA, TQ, LS mode) or 50% (CP mode) respect to the current setpoint. Under 1°C for 5 minutes, the supply fan is stopped and it will turn again if T3 becomes greater than 2°C for more than 5 minutes.



TAC7

Functions/ Heat / cool recovery /Anti-freeze - Supply flow reduced

- **Setup:**

Functions/ Heat / cool recovery /Anti-freeze

- Anti-freeze type: **Select Airflow reduction**

- Air flow reduction: Activation of the anti-freeze protection cycle by reducing the supply air flow. Reduction of the air flow from “High temperature”

- Low temperature: Stopping of the supply air fan from “Low temperature”

- High temperature: Reduction of the air flow from “High temperature”

- Stop supply air flow: Activation of the anti-freeze protection cycle by stopping the supply air fans. Stopping of the supply air fan from “Low temperature”

Functions/ Heat / cool recovery /Anti-freeze - Preheater

- **Description with KWin:**
  - antifrost protection of the heat exchanger by internal electrical battery (KWin): This battery will warm up the Incoming outdoor air when the exhaust air at the exchanger output (T3) will be lower than 1°C (default value of parameter "Anti-freeze temperature").
  - Regulation of the power sent to the battery through the command of solid state relay. The regulation is a PID type one and the parameters gain, derivative time and integrative time are configurable.
  - Postventilation with configurable time.
  - Extra protection:
    - Once 100% of the power is output to the KWin and T3 < 1°C, then both flows will be reduced by steps every same intervals until that T3 will exceed 1°C or that 33% of the airflows before reduction are reached. In this last case, a defrost process is entered for 30 minutes: KWin and Supply will be stopped while exhaust will be at its level before reduction. After the defrost period, the antifrost process will restart with Kwin at 100% and both flows at 33%. During airflow reduction, if T3 becomes higher than 1°C, the flows will increase at same rate than for reduction.
      Generated alarms: Type 12 - Alarm indicating heat exchanger anti-frosting alert
    - If the temperature T3 stays under -5°C for more than 5 minutes, the fans will stop and a RESET is necessary to restart them.
      Generated alarms: Type 13 - Alarm indicating anti-frosting alert

Functions/ Heat / cool recovery /Anti-freeze - Preheater

- **Description with EBAin:**
  - Antifrost protection of the heat exchanger by battery (EBAin): This battery will warm up the Incoming outdoor air when the exhaust air at the exchanger output will be lower than 1°C (configurable value).
  - Regulation of the opening of a 3 ways valve to reduce the gap between setpoint and actual value (AO2). The speed of the regulation is configurable. At fans start-up, before that fan status is ON, the valve is commanded at 50% opening,
  - This battery can be waterborne, electric (then parameter for postventilation must be set) or a heat pump. Digital output for water pump activation temperature on DO7.
  - For waterborne preheater, antifrost protection of the coil through the opening of the valve when the temperature on the coil, measured on T4, is below a configurable threshold: by default 4°C but need to be adapted. It is strongly recommended to use very low temperature freezing fluid like glycol.
  - Outside the unit. The EBAin outside the unit has to be installed by the customer in the Incoming outdoor air duct near the unit.
  - Need Kit EBA

Extra protection:

- Once 100% of the power is output to the EBAin and T3 < 1°C, then both flow swill be reduced by steps until that T3 will exceed 1°C or that 33% of the airflows setpoint before reduction are reached. In this last case, a defrost process is entered for 30 minutes: EBAin and Supply will be stopped while exhaust will be at its setpoint before reduction. After the defrost period, the antifrost process will restart with EBAin at 100% and both flows at 33%. During airflow reduction, if T3 becomes higher than 1°C, the flows will increase at same rate than for reduction.
  Generated alarms: Type 12 - Alarm indicating heat exchanger anti-frosting alert.
- If the temperature T3 stays under -5°C for more than 5 minutes, the fans will stop and a RESET is necessary to restart them.
  Generated alarms: Type 13 - Alarm indicating anti-frosting alert, Type 10 - Alarm indicating waterborne preheater anti-frosting alert

Functions/ Heat / cool recovery /Anti-freeze - Preheater

- **Setup:**

Functions/ Heat / cool recovery /Anti-freeze

- Antifrost type: **Select Preheater**

- Anti-freeze temperature: Enter the setpoint temperature for starting the anti-freeze protection cycle.

- **Wiring:**

See KWin and EBAin in Functions/Heat/Preheater

Functions/ Heat / cool recovery /Anti-freeze - Modulating bypass

- **Description:**
  - Antifrost protection of the heat exchanger by modulating bypass: this feature is available only for units with modulating bypass (always the case for GLOBAL and ESENSA models).
  - When temperature T3 of the exhaust air at the exchanger output falls under the setup setpoint temperature for antifrost protection (1°C by default, configurable value), the bypass will start to open by steps in order to increase temperature T3. The maximum opening is limited to the one that allows 50% of the airflow to bypass the heat exchanger when there is the pressure sensor for defrost.
    - Prevention of too cold air in the supply duct during antifrost with bypass opening: for units with reheater, If the supply temperature after the reheater (T5), while at 100% of its power, drops under 16°C, then the flows will be reduced by steps until that T5 will exceed 16°C or that 33% of the airflows setpoint before reduction are reached. If the flows stay at the minimum of 33% for more than 5 minutes, alarm 12 is given
  - Generated alarms: Type 18: Alarm indicating that the comfort temperature is too low relative to set point temperature, Type 15 - Alarm indicating a faulty position of the modulating by-pass relative to the commanded position.

Functions/ Heat / cool recovery /Anti-freeze - Modulating bypass

- **Setup:**

Functions/ Heat / cool recovery /Anti-freeze

- Antifrost type: **Select Bypass Modulation**

- Anti-freeze temperature: Enter the temperature setpoint to start the anti-freeze protection cycle by in steps opening the modulating bypass damper.

Functions/Heat / Cool

Functions/Heat / Cool:

Status monitoring and settings for external reversible waterborne combicoil (EBA+-) or for reversible heat pump/chiller.

Status

Functions/Heat / Cool/Status:

All the relevant values can be read here. Used for performance checks.

Settings

Functions/Heat / Cool/Settings :

- Reversible Water: Reversible Water (+/-)
- Regulation speed: Regulation speed of the 3-ways valve. Default speed=T. Slower regulation for the high values, faster regulation for the lower values. Only change this value if there is a temperature stability problem.
- Anti-freeze temperature: temperature setpoint for starting the anti-freeze protection cycle. 4°C recommended for sensor in the air flow, 12°C for the contact sensor.
- Reversible Water First to start cascade: In case of presence of another reheater, indicates the level of the reheater in the cascade: first or next (default). reheaters with same levels start in parallel, so at least one of them must have been set with level first to create a cascade.

Functions/Heat / Cool

Settings

Functions/Heat / Cool/Settings :

- Heat Pump and Chiller: Heat pump and chiller: NONE or PRESENT. When set to PRESENT, the none/present parameter is reset for the: chiller, waterborne recooler and combi-coil.
- Regulation speed: Regulation speed of regulation algorithm for heat pump/chiller or only chiller. Default speed=T. Slower regulation for the high values, faster regulation for the lower values. Only change this value if there is a temperature stability problem.
- Defrost supply airflow: Speed of supply air fan during defrost (exhaust air fan speed will follow supply air fan speed so that exhaust/supply ratio is maintained). Used in CA mode and if no electrical reheater is present.
- Heat Pump and Chiller First to start cascade: In case of presence of another reheater, indicates the level of the reheater in the cascade: first or next (default). reheaters with same levels start in parallel, so at least one of them must have been set with level first to create a cascade.

Season management

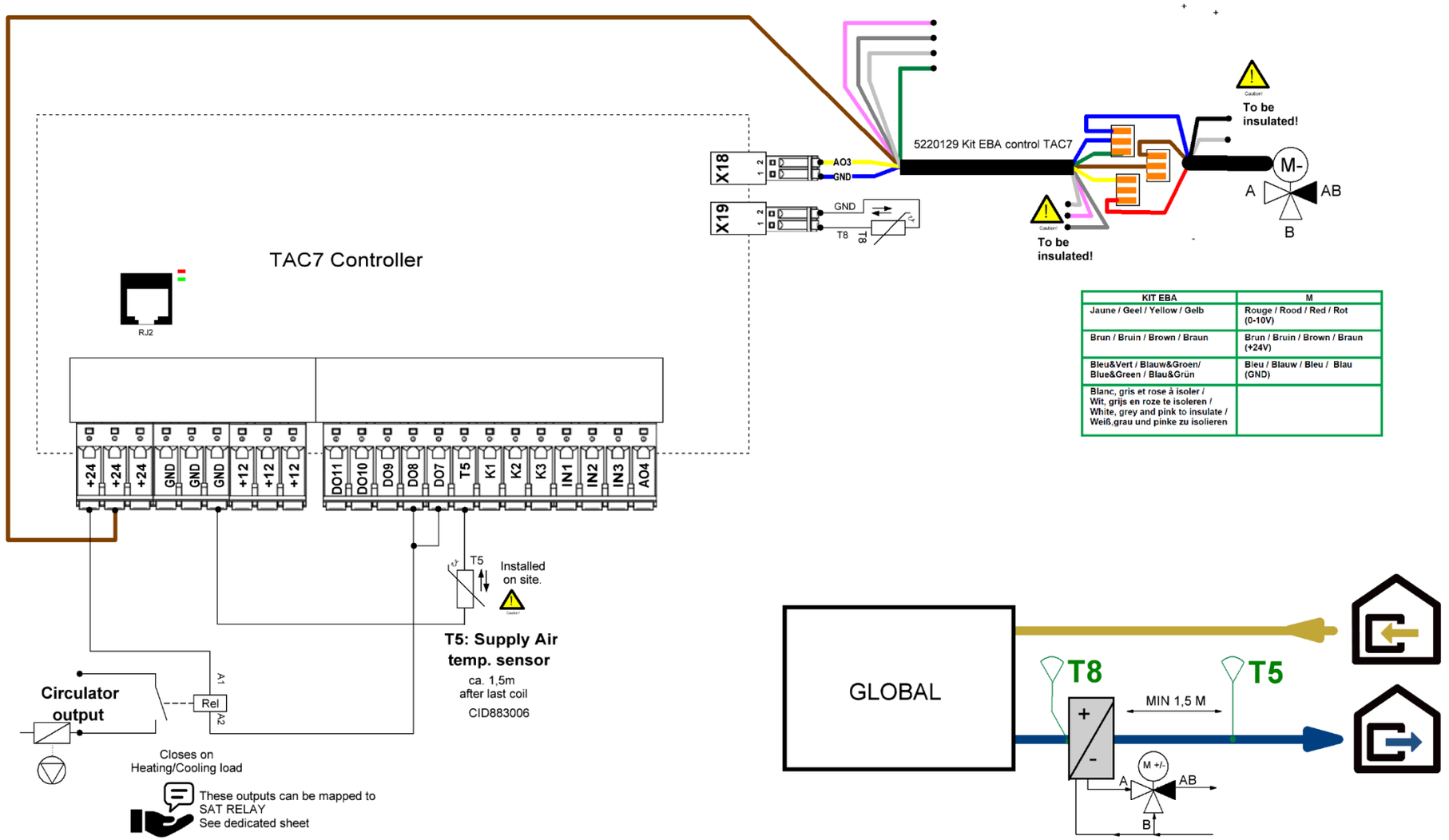
Functions/Heat / Cool/Season management

Select the periods of the year for which the reheating is deactivated. Select the periods of the year for which the recooling is deactivated.

- Season management - Heating OFF: Select the periods of the year for which the reheating is deactivated.
- Season management - Cooling OFF: Select the periods of the year for which the recooling is deactivated.

Functions/Heat / Cool

- **Wiring –reversible waterborne combicoil EBA+-:**

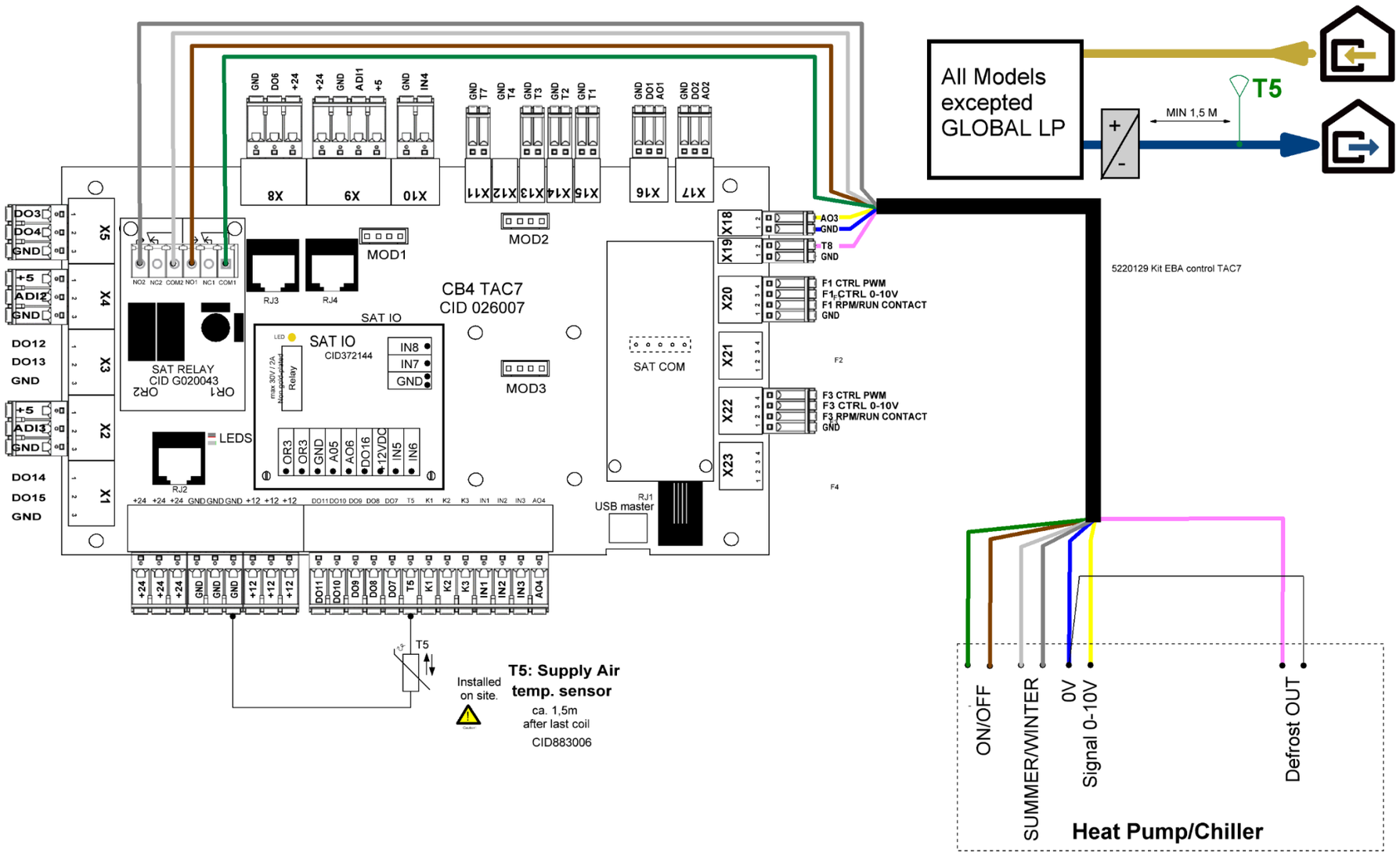


KIT EBA	M
Jaune / Geel / Yellow / Gelb	Rouge / Rood / Red / Rot (0-10V)
Brun / Bruin / Brown / Braun	Brun / Bruin / Brown / Braun (+24V)
Bleu&Vert / Blauw&Groen/ Blue&Green / Blau&Grün	Bleu / Blauw / Bleu / Blau (GND)
Blanc, gris et rose à isoler / Wit, grijs en roze te isoleren / White, grey and pink to insulate / Weiß,grau und pinke zu isolieren	

TAC7

Functions/Heat / Cool

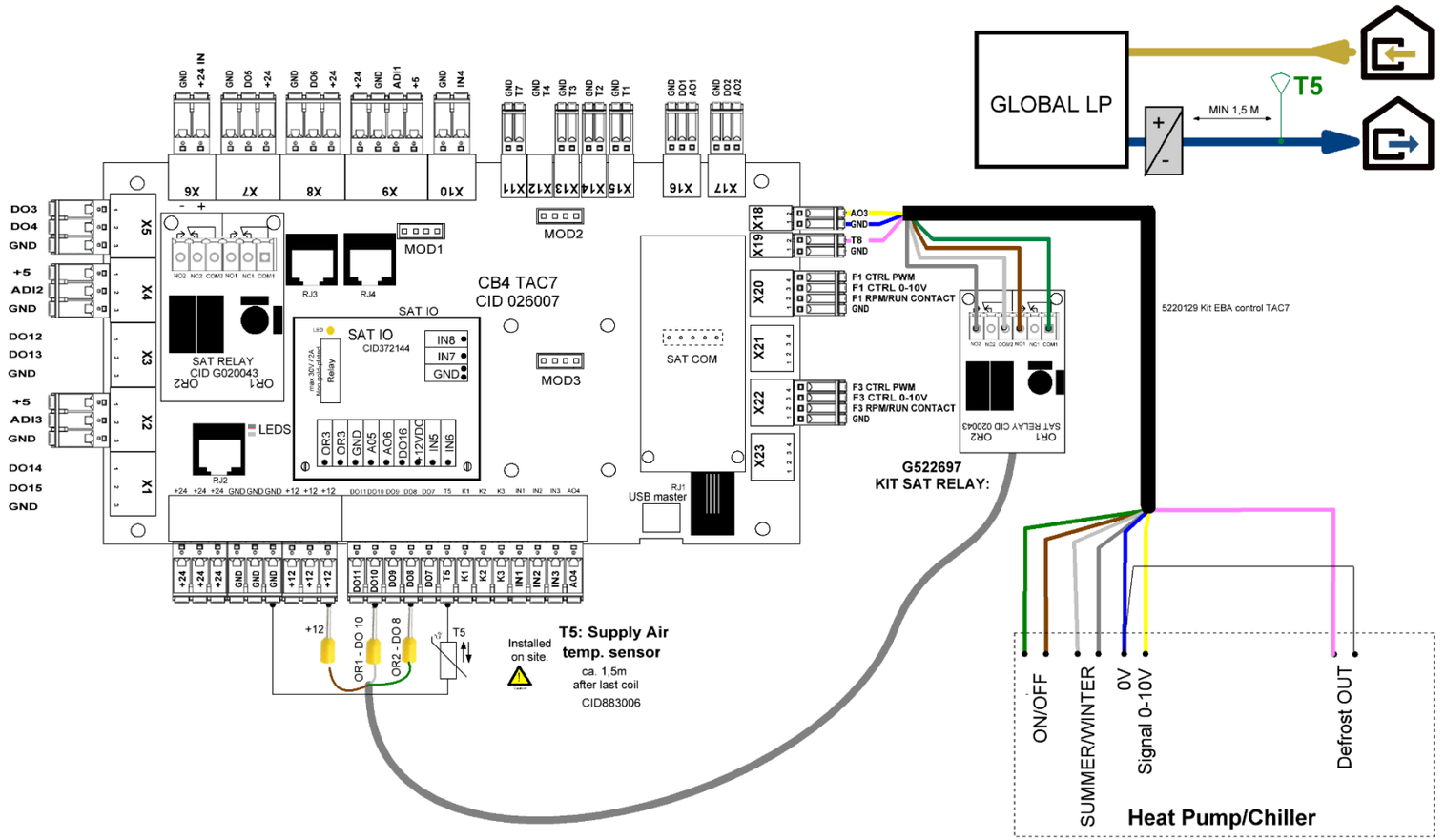
- **Wiring – Heat Pump & Chiller on all models excepted GLOBAL LP:**



TAC7

Functions/Heat / Cool

- **Wiring – Heat Pump & Chiller on GLOBAL LP ONLY:**



- **Associated information status :**

Dashboard/Process Status: Heating when battery active in heat mode, cooling when active in cool mode.

TAC7

Functions/Inputs/Outputs

Functions/Inputs/Outputs:

Status monitoring of digital/analogue input/output and change of default mapping functions to digital input/output (for advanced users only, previous training required)

Functions/Inputs/Outputs / Status - Inputs

Inputs : All the relevant values can be read here. Used for performance checks.

Status - Inputs

Functions/Inputs/Outputs / Status - Outputs

Outputs : All the relevant values can be read here. Used for performance checks.

Status - Outputs

Functions/Inputs/Outputs / Settings

Allows to switch from contact master to TACtouch and vice versa, to configure the presence of SAT IO, SAT RELAY (excepted for GLOBAL LP models), sensors for air quality measurements. Finally, possibility to enable the mapping of features to other inputs or outputs then those used by default.

- Contacts K1-K2-K3 Master: Set this parameter to control the unit with electrical contacts K1-K2-K3 instead of the speed selection buttons of the control screen.
- SAT IO present: Indication of the presence of the optional SAT IO board
- SAT Relay present: Indication of the presence of the optional SAT Relay board
- Sensors for measurement: Sensors for measurement: CO2, relative humidity, VOC, Fine dust ppm, temperature
- User Digital I/O Mapping: Mapping for user Digital Inputs/Outputs. Caution: change mapping should be done only by trained personal for a clear purpose. Updated diagram with changed mapping should be provided. It is strongly recommended to make a copy of all parameters before any change and to restore them in case of errors during mapping.

Settings

Functions/Inputs/Outputs

Functions/ Inputs/Outputs / 0-10V output

0-10V output

In case of presence of SAT IO. Configuration of the 0-10V OUT1 and OUT2 outputs linearly proportional to fan airflow or pressure (when available).

- OUT1: Information provided by the 0-10V OUT1 signal.
- OUT2: Information provided by the 0-10V OUT2 signal.

Functions/Inputs /Outputs / Air Quality sensors - Measure

Air Quality sensors - Measure

Values obtained from measurements by air quality sensors which can be assigned to specific locations relative to the air handling unit.

- Type: Output value by sensor as analogue voltage or data on communication bus: Modbus or Serial
- Measure: Measured physical magnitude by the sensor
- Scale Factor: Scale factor to obtain directly readable and converted measured value from sensor in desired physical unit
- I/O: Selection of analogue input used for the sensor.
- Vmin: Minimum voltage of the sensor connected to Analogue Input.
- Vmax: Maximum voltage of the sensor connected to Analogue Input.
- Bus: Bus on which the sensor is connected to. Used for Modbus/serial sensor type.
- Address: Address of the sensor. Used for Modbus type
- Register: Modbus register number to access of the sensor. Used for Modbus type

Functions/Inputs /Outputs / Pressure - Modbus Sensors

Pressure - Modbus Sensors

Values obtained from measurements by pressure sensors which are used by corresponding configured functions.

Functions/Communication

Functions/Communication:

Settings for communication with control through user interface, eventual SAT MODBUS or SAT WIFI/ETHERNET if present and finally for Field buses.

Functions/ Communication/ Connection Setup

Connection Setup

Settings for connections to control circuit board.

- Modbus TYPE: Choose protocol type: RTU for Modbus RTU, TCP/IP for Modbus TCP/IP. After change, a COM reset is necessary to apply new communication settings (see dedicated parameter)
- TAC Modbus address: Enter the TAC Modbus address (1…247)
- IP (only for simulator): IP address of the SAT WIFI/ETHERNET. If not known because the SAT is client into a DHCP network, then the discovery function can be used to identify the SAT into that network.
- Port (only for simulator): Communication port. After change, a COM reset is necessary to apply new communication settings (see dedicated parameter)
- Discover: Discover TAC units connected on the network
- Reset COM: Reset Communication with TAC
- Resume control via TACtouch (OFF): If control previously have been carried out via Modbus, Wi-Fi, KNX, Ethernet connection; reset the configuration and control functions via the TACtouch.
- Add to Network: Add this Air Handling Unit to the network list

Functions/ Communication/ SAT MODBUS configuration

SAT MODBUS configuration

SAT MODBUS settings for communication with control circuit board

- TAC Modbus address: Enter the TAC Modbus address (1…247)
- Baudrate: Modbus Baudrate (1200, 4800, 9600, 19200; 38400)
- Parity and stop bits: Modbus Parity and stop bits (No parity and 1 stop bit, Even parity and 1 stop bit, Odd parity and 1 stop bit; No parity and 2 stop bits, Even parity and 2 stop bits, Odd parity and 2 stop bits)

Functions/Communication

Functions/ Communication/ Configuration of the SAT

Configuration of the SAT LAN

SAT WIFI/ETHERNET settings for communication with control circuit board

- IP configuration.

N.B.: to validate the changes of settings, it is necessary to reset the control board.

- IP 1: IP description
- IP 2: IP description
- IP 3: IP description
- IP 4: IP description
- Netmask 1: Netmask
- Netmask 2: Netmask
- Netmask 3: Netmask
- Netmask 4: Netmask
- Gateway 1: Gateway
- Gateway 2: Gateway
- Gateway 3: Gateway
- Gateway 4: Gateway
- DNS 1: DNS (settings not relevant excepted when connected to Swegon 4G router to make Swegon Cloud access easier)
- DNS 2: DNS
- DNS 3: DNS
- DNS 4: DNS

Functions/Communication

Swegon

Bus

Communication

BUS

Configuration of internal and external serial bus

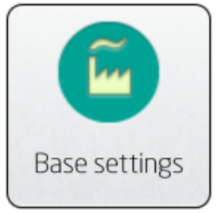
- RJ1 (TACtouch) - Address: BUS RJ1 (mainly used for TACtouch) Modbus Address: 0, TACtouch/HMI is slave; if set to 1..247, then TACtouch/HMI is master. Default value is 1.
- RJ1 (TACtouch) - Baudrate: BUS RJ1 (TACtouch) - Modbus Baudrate (1200, 4800, 9600, 19200; 38400)
- RJ1 (TACtouch) - Parity and stop bits: BUS RJ1 (TACtouch) - Modbus Parity and stop bits (No parity and 1 stop bit, Even parity and 1 stop bit, Odd parity and 1 stop bit; No parity and 2 stop bits, Even parity and 2 stop bits, Odd parity and 2 stop bits)
- RJ2 (EXT) - Baudrate: BUS RJ2 (EXT) - Modbus Baudrate (1200, 4800, 9600, 19200; 38400)
- RJ2 (EXT) - Parity and stop bits: BUS RJ2 (EXT) - Modbus Parity and stop bits (No parity and 1 stop bit, Even parity and 1 stop bit, Odd parity and 1 stop bit; No parity and 2 stop bits, Even parity and 2 stop bits, Odd parity and 2 stop bits)
- RJ3 (INT2) - Address: BUS INT2 Modbus Address: 0, TAC7 is master; if set to 1..247, TAC7 is slave. Default value is 1.
- RJ3 (INT2) - Baudrate: BUS RJ3 (INT2) - Modbus Baudrate (1200, 4800, 9600, 19200; 38400)
- RJ3 (INT2) - Parity and stop bits: BUS RJ3 (INT2) - Modbus Parity and stop bits (No parity and 1 stop bit, Even parity and 1 stop bit, Odd parity and 1 stop bit; No parity and 2 stop bits, Even parity and 2 stop bits, Odd parity and 2 stop bits)
- RJ4 (INT1) - Baudrate: BUS RJ4 (INT1) - Modbus Baudrate (1200, 4800, 9600, 19200; 38400)
- RJ4 (INT1) - Parity and stop bits: BUS RJ4 (INT1) - Modbus Parity and stop bits (No parity and 1 stop bit, Even parity and 1 stop bit, Odd parity and 1 stop bit; No parity and 2 stop bits, Even parity and 2 stop bits, Odd parity and 2 stop bits)

Functions/Base settings

Functions / Base settings / Restore factory settings:

Restore factory settings

Restore factory settings
- Restore factory settings: Are you sure you want to reset the AHU to the factory settings?

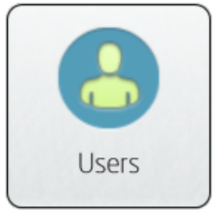


Functions / Base settings / TACtouch:

TACtouch

TACtouch settings.E.g.: Brightness, sound, etc.
- Time Standby screen
- Brightness: Change the brightness of the TACtouch.
- Time Standby screen
- Brightness Standby screen
- Tone: Activate a tone when buttons are touched.
- Audible alarm: Activation of a sound when an alarm is tripped.

Functions/Users



Functions/Users:

Possibility to modify PIN code for each access level.

- Local level access code: Enter the 4 digits code to access with local level
- Installation level access code: Enter the 4 digits code to access with installer level
- Service level access code: Enter the 4 digits code to access with service level

Integration with BMS

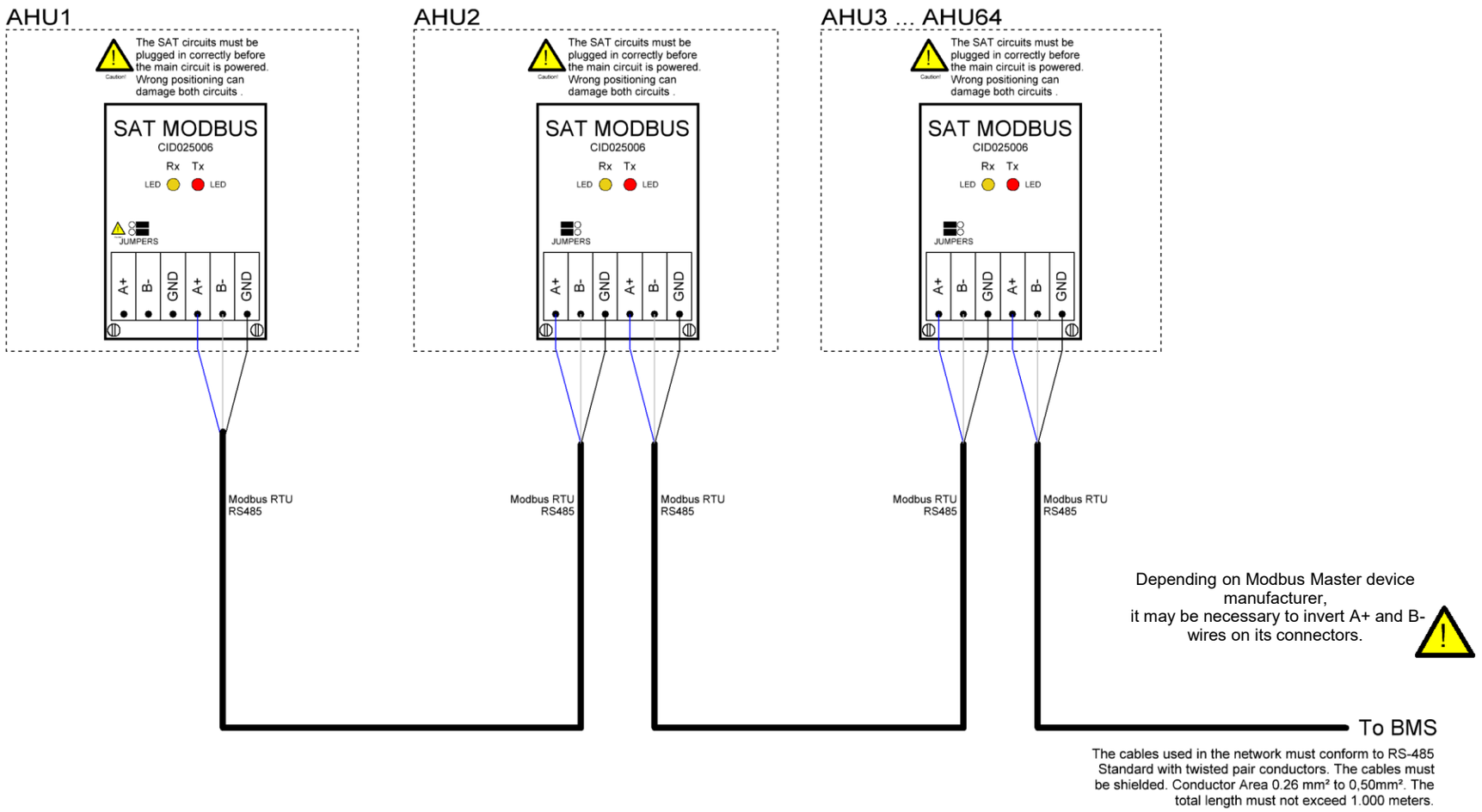
TAC7 control give the possibility to access locally or remotely one or more unit through different kind of network

- **Modbus RTU:**
  - **Description:**
    - Complete configuration of the unit
    - Complete control of the unit
    - Need SAT-MODBUS extra board
    - Network with up to 64 Units
    - Enables integration with BMS
  - **Settings in Functions/Communication/ SAT MODBUS Configuration**
  - **Associated information status:**

    Dashboard/Control Status: Communication
  - **Reference:** MI Regulation TAC7 + MODBUS RTU, MI Regulation TAC7 + MODBUS TABLE

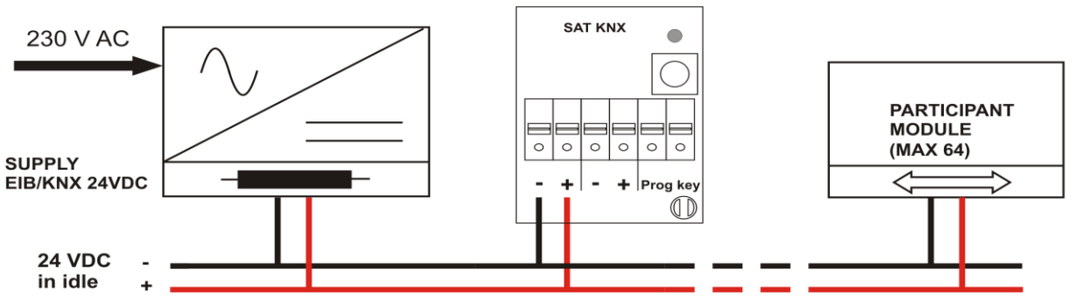
Integration with BMS

- **Modbus RTU:**
  - **Wiring**



Integration with BMS

- **KNX:**
  - **Description:**
    - Complete control of the unit
    - Need SAT-KNX extra board
    - Network with up to more than 1000 Units
    - Complete integration and direct, non centralized, interaction with other KNX devices thanks to more than 80 group objects.
    - Network configuration, commissioning and monitoring through standard KNX Association software ETS (4/5)
  - **Wiring:**



  - **Associated information status:**

    Dashboard/Control Status: Communication

  - **Reference:** MI Regulation TAC7 + KNX TAC7

Integration with BMS

- **Wi-Fi/ETHERNET:**
  - **Description:**
    - Complete configuration of the unit
    - Complete control of the unit
    - Need SAT WIFI-ETHERNET extra board
    - Network with up to more than 1000 Units
    - Application protocol: MODBUS TCP/IP.
    - Interfacing with PC (Windows 7/8/10).
    - Enables integration with BMS
    - Enables remote access (with VPN)
    - Discovery function: the SAT WIFI-ETHERNET on a network answer to a broadcast message sent on this network.

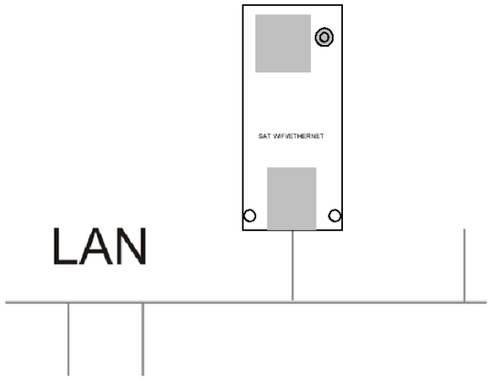
Integration with BMS

- **Wi-Fi/ETHERNET:**
  - **Setup: the setup can be done with TACtouch but also with a PC directly connected to the SAT WIFI-ETHERNET.**
  - **A control board reset is necessary to validate the changes**
  - **Ethernet Settings in Functions/Communication/ Configuration of the SAT LAN**
  - **Wi-Fi parameters configuration of the SAT-WIFI through integrated web server (choice between access point with security mode and WPA2 protection key, or station with static ip address or DHCP)**
  - **Reference: MI Regulation TAC7 + MODBUS TCPIP, MI Regulation TAC7 + MODBUS TABLE**

Integration with BMS

- **Wi-Fi/ETHERNET:**
  - **Wiring - Ethernet:**

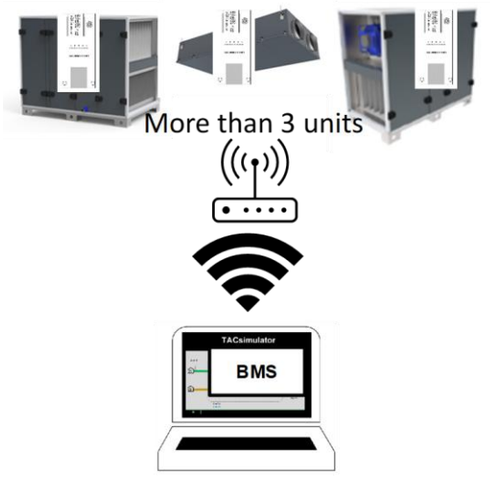
    Simply connect in the RJ45 connector of the SAT WIFI-ETHERNET a standard Ethernet cable which is connected on the other end to the network.



  - **Wiring – Wi-Fi: none**

The SAT WIFI-ETHERNET can be a WIFI Access Point:

The SAT WIFI-ETHERNET can be a station of an existing WIFI Access Point (which can be another SAT WIFI or not):



Integration with BMS

- **BACnet:**
  - **Description:**

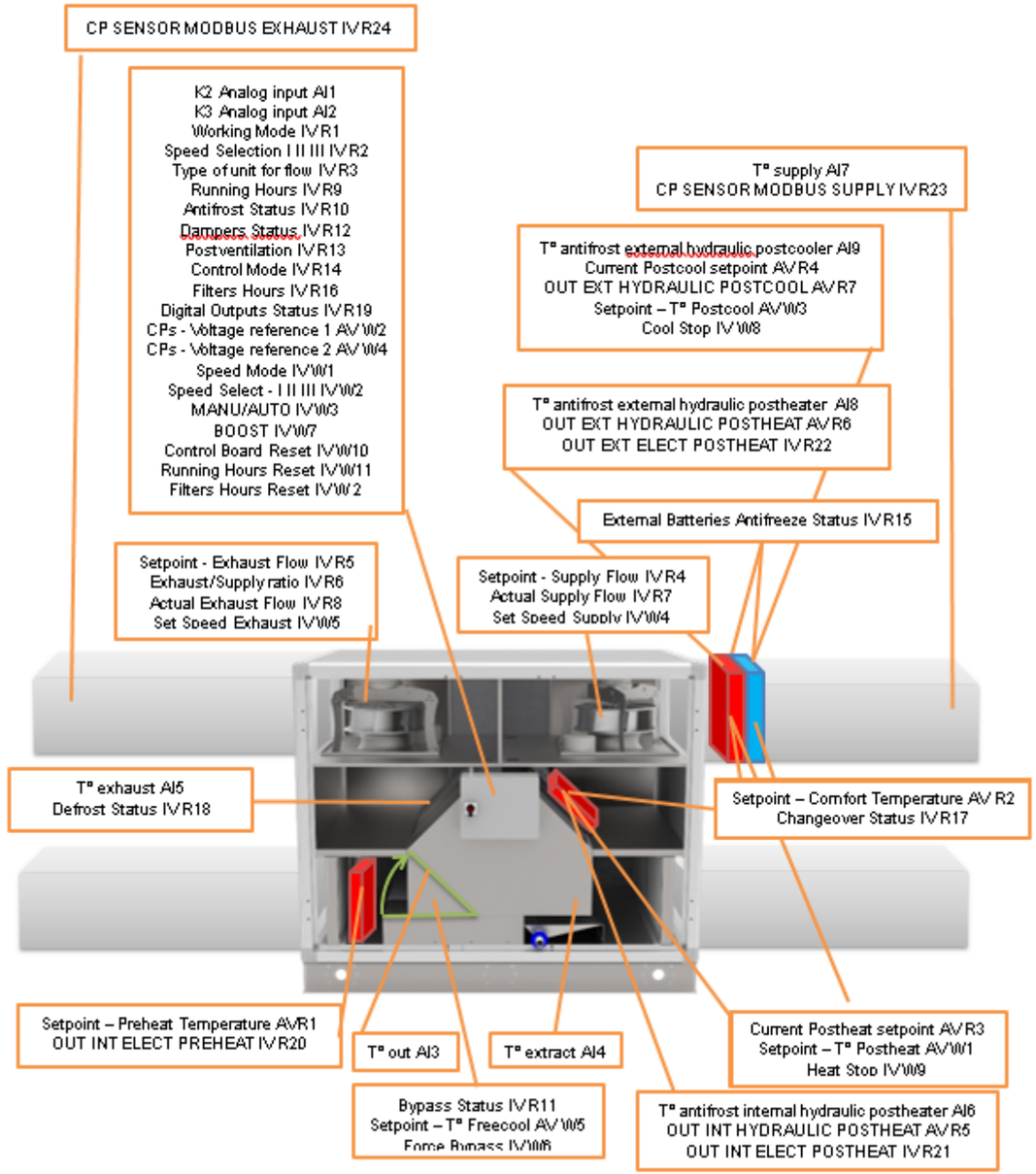
Gateway allowing BACnet support for up to 4 units with double flows and heat recovery equipped with TAC7 control boards and SAT WIFI-ETHERNET.
The **BACnet Standardized Device Profile (Annex L)** of the BACnet device is: BACnet Application Specific Controller (B-ASC). The supported Data Link Layer Options are BACnet / IP and MS/TP slave.

  - **Standard Object Types Supported:**

Object Type	
Analog Input	Object_Identifier, Object_Name, Object_Type, Present_Value, Status_Flags, Event_State, Out_Of_Service, Units, Description.
Analog Value	Object_Identifier, Object_Name, Object_Type, Present_Value, Status_Flags, Event_State, Out_Of_Service, Units, Description.
Integer Value	Object_Identifier, Object_Name, Object_Type, Present_Value, Status_Flags, Event_State, Out_Of_Service, Units, Description.
Device	Object_Identifier, Object_Name, Object_Type, System_Status, Vendor_Name, Vendor_Identifier, Model_Name, Firmware_Revision, Application_Software_Version, Protocol_Version, Protocol_Revision, Protocol_Services_Supported, Protocol_Object_Types_Supported, Object_List, Max_APDU_Length_Accepted, Segmentation_Supported.

Integration with BMS

- **BACnet:**
  - **Overview:**



Integration with BMS

- **BACnet:**
  - **Installation:**

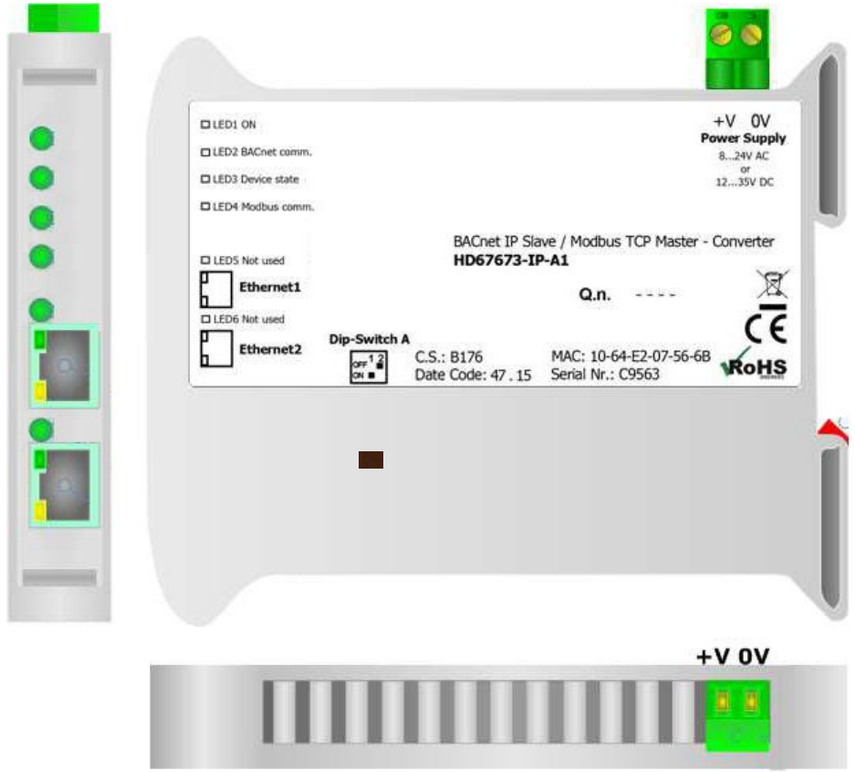
LED 1 - GREEN: ON
LED 2 - GREEN: BACnet comm.
LED 3 - Device state
LED 4 - GREEN: Modbus comm.

LED 5 - GREEN: Not used

Connector 3: Ethernet 1 Port (RJ45 Plug)

LED 6 - GREEN: Not used

Connector 4: Ethernet 2 Port (RJ45 Plug)



Use the rail DIN clamp to mount the gateway module on a DIN rail.

Rail DIN clamp

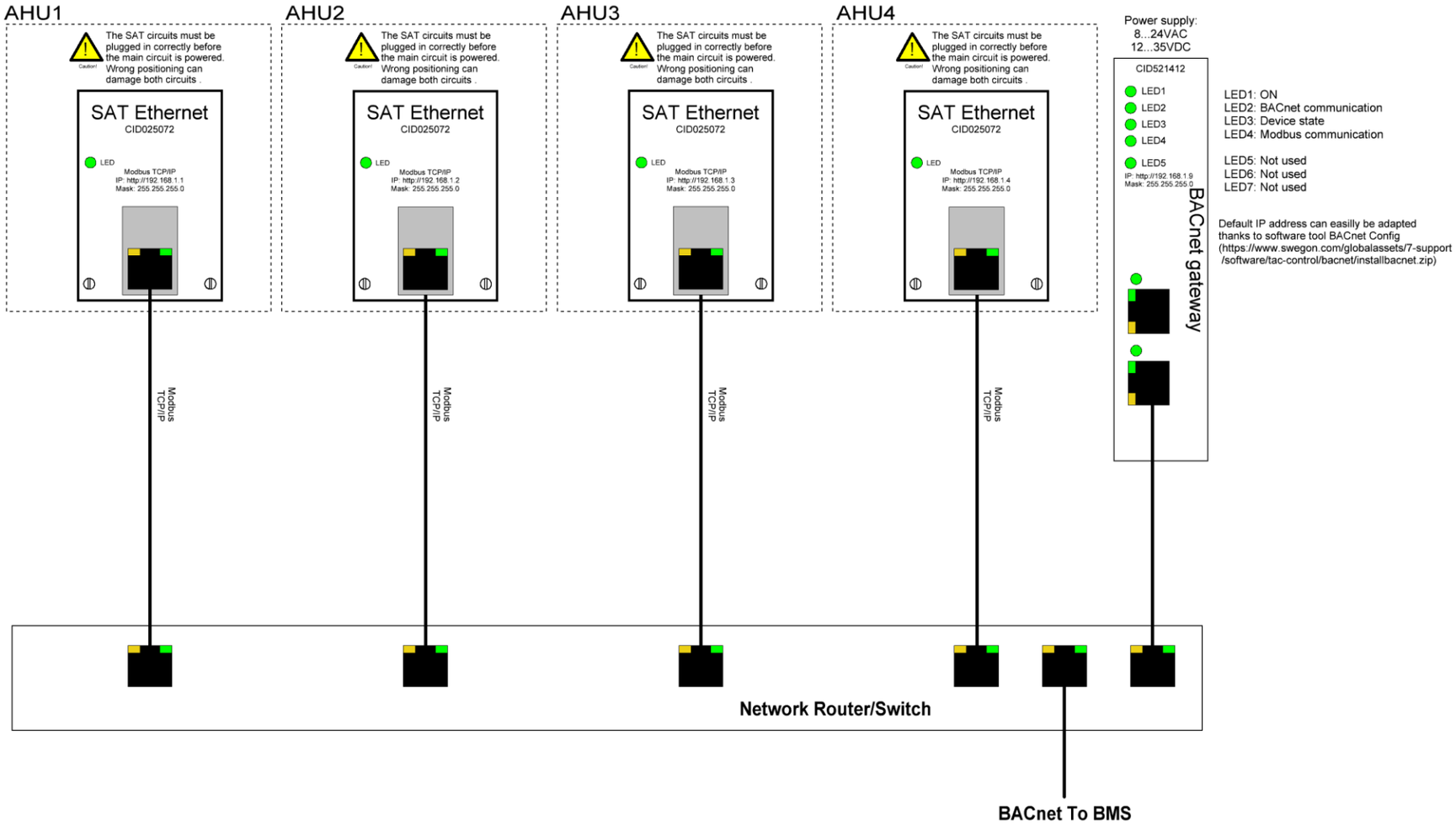
Connector 1:
Power supply port
0V = Ground
+V = Positive wire
VAC : min 8V ; max 24V
VDC : min 12V ; max 25V

  - **Configuring IP settings on each unit with TACtouch:**

see Functions/ Communication/ Configuration of the SAT LAN TAC7

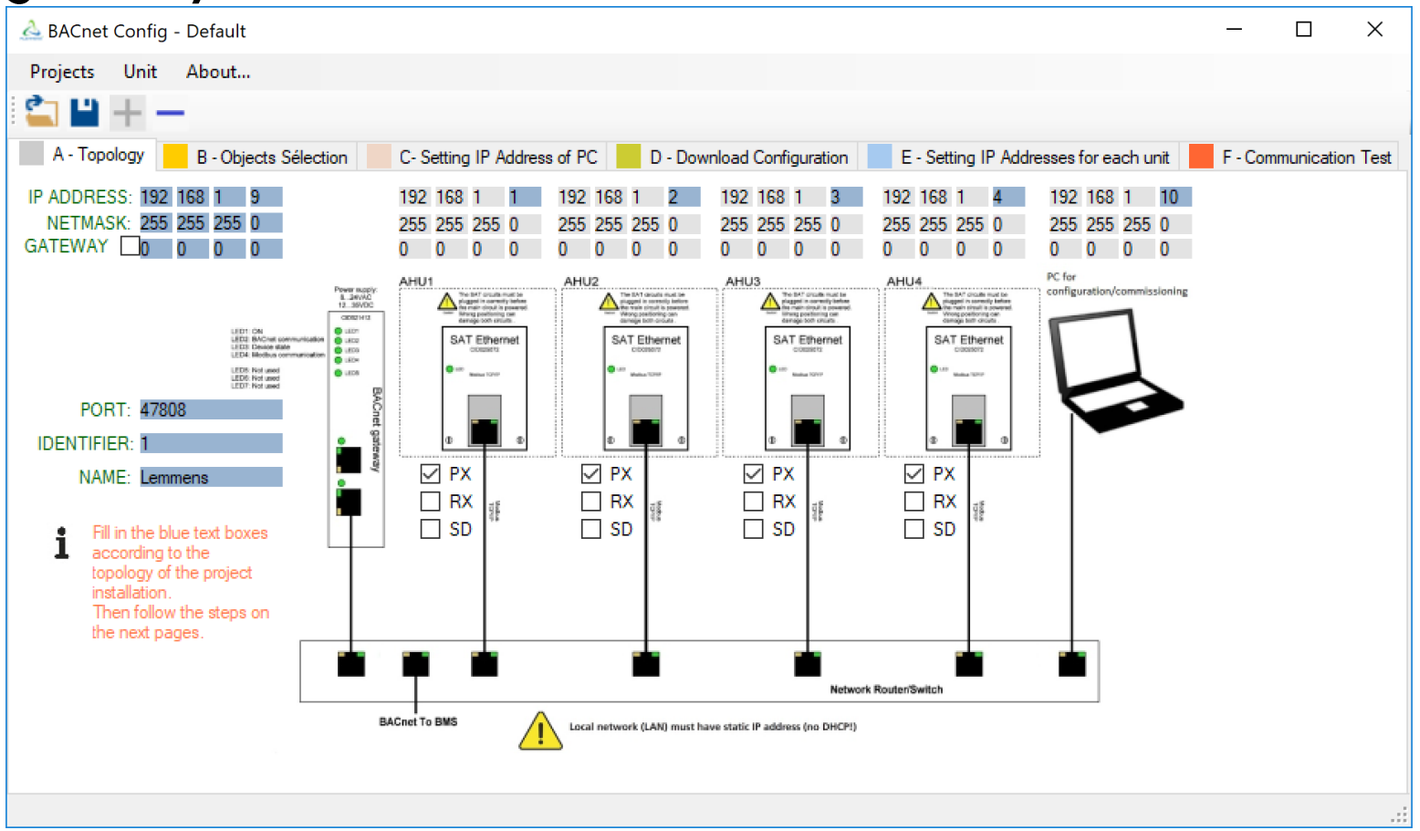
Integration with BMS

- **BACnet:**
  - **Wiring:**



Integration with BMS

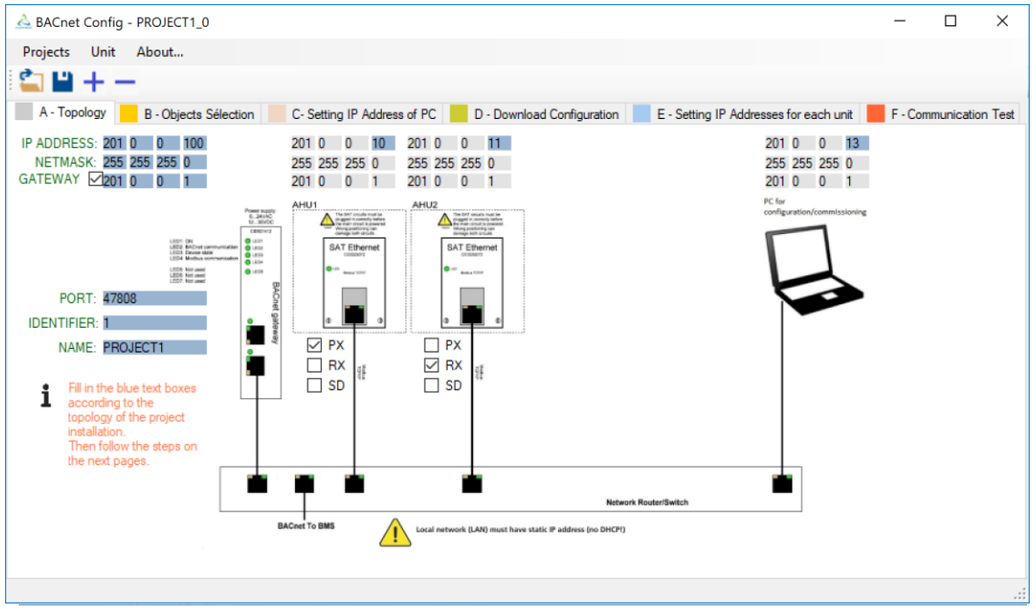
- **BACnet:**
  - **Configuration: BACnet Configurator provides an intuitive configuration interface that guides the user for configuring the layout, select the desired objects, download configuration to the gateway and test the communication between involved devices.**



TAC7

Integration with BMS

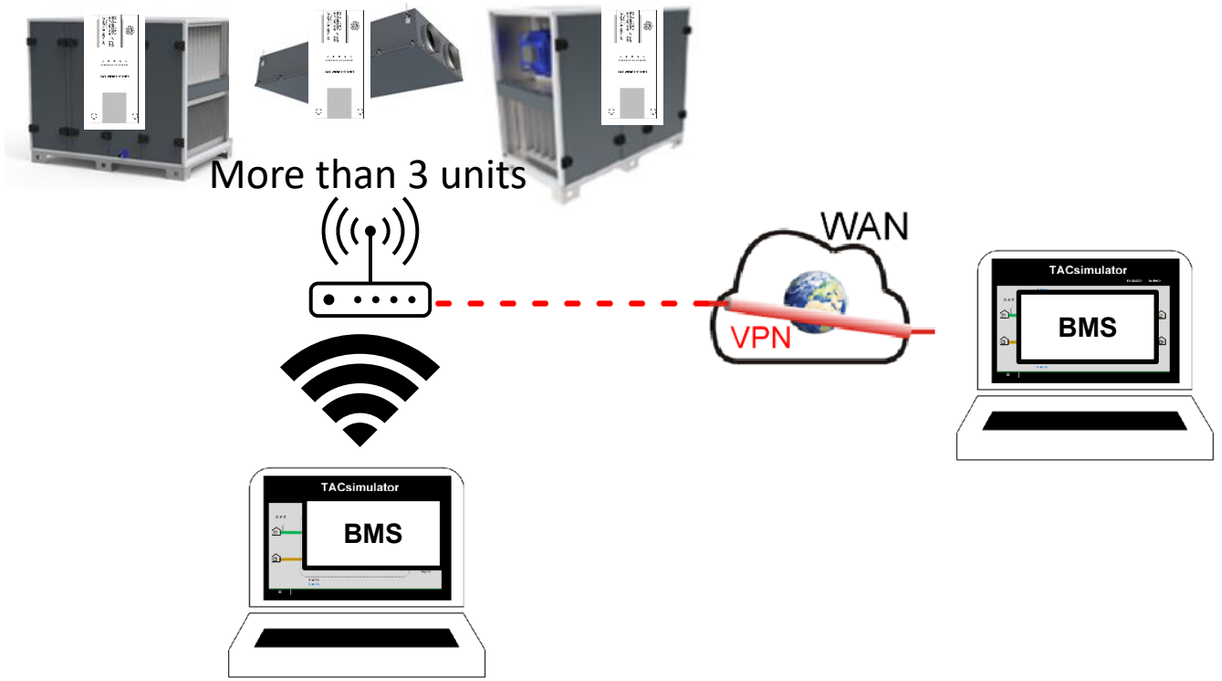
- **BACnet:**
  - **Exporting/Importing projects: possibility to export the layout from a location and to important in another site for downloading**



  - **Reference: [BACnet gateway_SW_EN]**

Remote Access with VPN

- **Description: using SAT WIFI-ETHERNET, a VPN router and a VPN service allow to remote access the units connected to the local network of the VPN router.**
- **Wiring:**



Cloud Swegon

- Description: using SAT WIFI-ETHERNET-MQTT, a common internet connectivity allows access to the services offers by the cloud Swegon.
  - Inside Portal: Free; AHU Health check; Simple view on actual values & alarms
  - Inside Manager: Subscription; AHU Mangement & analysis
- SAT WIFI-ETHERNET-MQTT :
  - Supports same Wi-Fi and Ethernet characteristics as SAT WIFI-ETHERNET.
  - MQTT protocol support: Message Queuing Telemetry Transport, used to communicate with Swegon Cloud Services.
  - Digital Certificate: ensures data security. Validity period is 2 years. Automatically renewed every year according to subscription conditions. In case of expiration, connection to the cloud Swegon will not be possible anymore until that a retrofit process has been executed by Swegon Service teams. This will download a new certificate.
  - Reference: [MI Regulation TAC7 + MODBUS TCPIP TAC7]

Cloud Swegon

- Swegon INSIDE
  - Swegon INSIDE Swegon's digital services are gathered under the name Swegon INSIDE. These services make it possible to monitor, control and visualise compatible units in a heating, ventilation and air conditioning solution, as well as the indoor climate in a building.
  - Optional SAT WIFI/ETHERNET/MQTT CID 020056, compatible with TAC7 Air handling units, are supplied with a certificate from the factory. TAC7 Air handling units manufactured already equipped with only SAT WIFI/ETHERNET can be supplied with a certificate afterwards (retrofit), see below. In both cases, the SAT must have connectivity that is to say:
    - Either the SAT is connected to a LAN (local area network) which is itself connected to the internet through a router. Make sure that IP address assigned and configured for the SAT is not blocked for internet access by the router (eventually contact your IT organization).
    - Or the SAT is connected to the optional Swegon 4G router (see specific manual).

TAC7

  - Also see the separate instruction regarding safety

Cloud Swegon

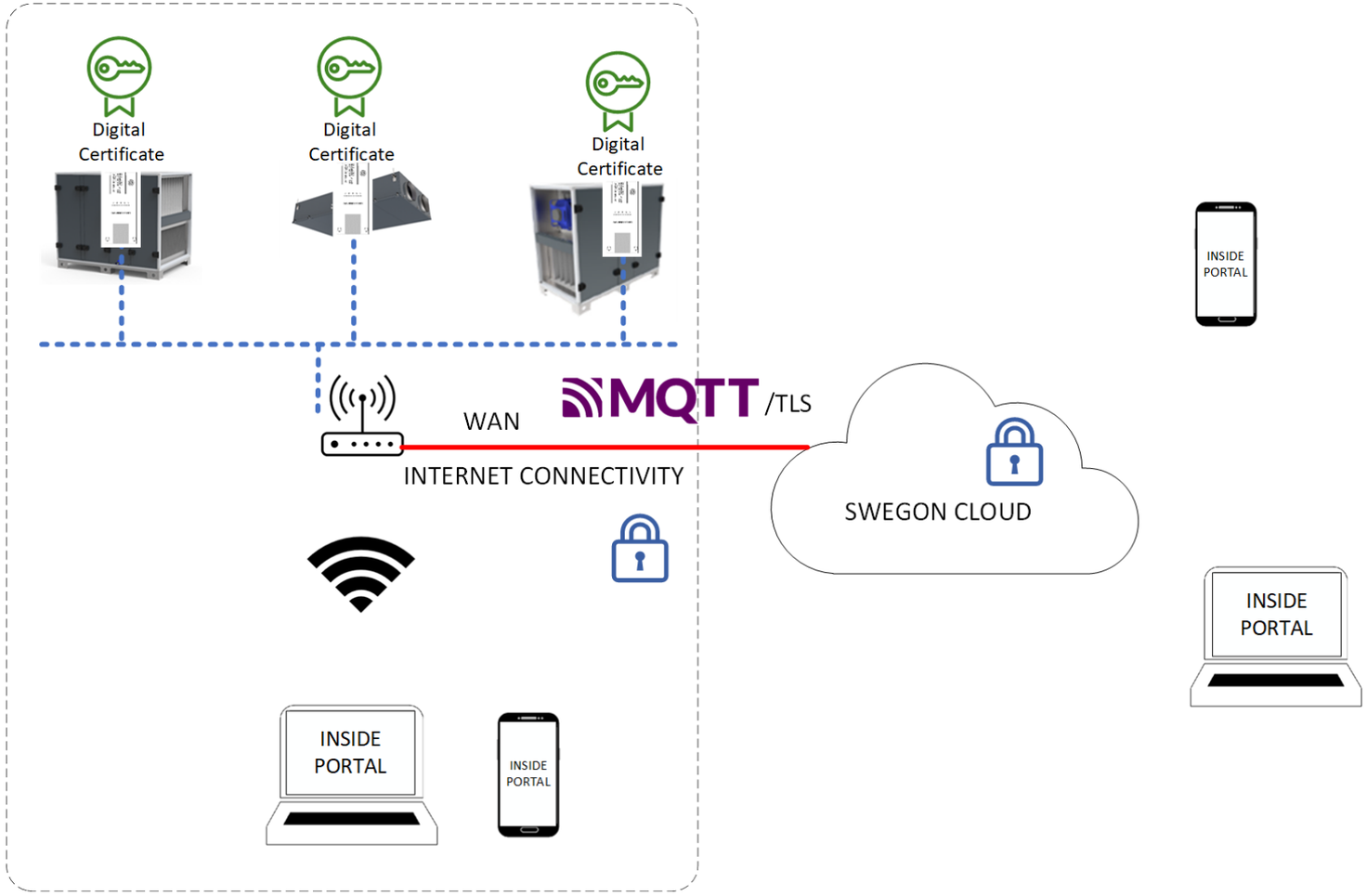
- Swegon INSIDE
  - In order to read data, an account must be created.
    1. Create an account in Swegon INSIDE Portal by going to Swegon's website (swegon.com). Click on "SUPPORT & SOFTWARE" in the menu. Scroll down and click on the link "Create account for INSIDE Portal".
    2. Fill in the form, including the serial number, and then press "Send".
    3. Wait for a response by e-mail.
    4. Log into INSIDE Portal to view current products.

Cloud Swegon

- **Swegon INSIDE**
  - **Retrofit. Make sure that serial number is filled in.**
  - **Then download activation code:**
    1. Go to Swegon's web site (swegon.com). Click on "SUPPORT & SOFTWARE" in the menu. Scroll down and click on the link "Make your product INSIDE Ready".
    2. Fill in the form, select product GLOBAL or ESENSA, enter serial number of the air handling unit and MAC address (see label on the sat indication "WMAC").
    3. Wait for a response by e-mail.
    4. Activate Swegon INSIDE. Connect PC to the same network of the SAT. Install the software "SAT WIFI/ETHERENT TAC7 certificate TACsimulatorV2" available on web site. Connect the PC to the same network of the SAT. In the function "Communication" of the application TACsimulatorV2, choose Modbus TCP/IP as communication type, and select the IP address of the SAT. The button "Discovery" returns all the SAT IP addresses available on the network. Then reset the communication to establish connection with the SAT.
    5. Fill in ID and activation code (see e-mail) in that application. Use level "Service" to download the code for the certificate activation, using dedicated fields in the function "Software Versions" of the application TACsimulatorV2. Press the button to download the codes, after the operation, which can take a few seconds, a popup message will appear where the last row must indicate "reenrolment successful". TAC7

Cloud Swegon

- **Wiring:**



TAC7

Cloud Swegon

- **Using Swegon Router:**

  - **After having placed the antenna in a location ensuring a correct level strength for the 4G signal of the router, connect the router to the SAT using a standard Ethernet cable RJ45. The router must be supplied with +25V DC according to here below diagram.**

    Cable Specifications:

    Ethernet cable, UTP category 5, 5e or 6 with RJ45 male connectors.
    Maximal length = 100m.

  - **Configure the IP settings as indicated in table here below. Go in function Function/Communication/Configuration of SAT LAN**

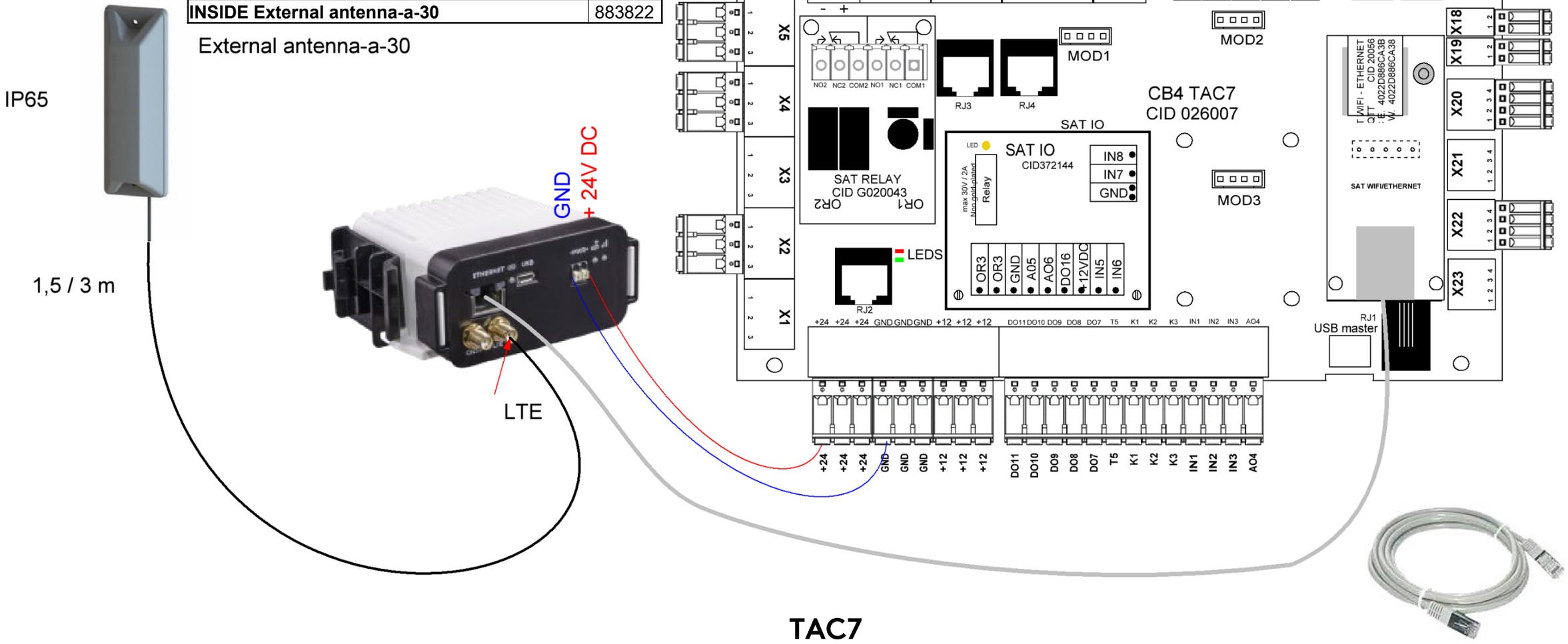
DHCP	Off
IP address	169.254.235.1
Netmask	255.255.255.248
Default gateway	169.254.235.6
Primary DNS	8.8.8.8

Cloud Swegon

- **Using Swegon Router - Wiring:**

Label	CID
INSIDE Connect, fitted in electrical cabinet	883819
INSIDE Connect, delivered loose (no PSU)	883820
INSIDE External antenna-a-15	883821
INSIDE External antenna-a-30	883822

External antenna-a-30



TAC7

Alarms

Multiple types of Alarm generation and reporting

- **Description:**
  - 24 types of alarms
  - Activation of digital output DO9 in case of alarm.
  - Activation of digital output DO10 in case of pressure alarm
  - Alarm LED activation on TAC7 board according to the type of alarm
  - Display of message alarm on TACtouch
  - Auto resetting or no autoresetting alarms. For those last ones, after correction of the failure, press ‘RESET’ button in active alarms screen of the TACtouch.
  - Alarm communication with networking modules
  - Log of 70 alarm events with start and eventually end time-date for each recorded alarms.

Alarms

- **Alarms types:**

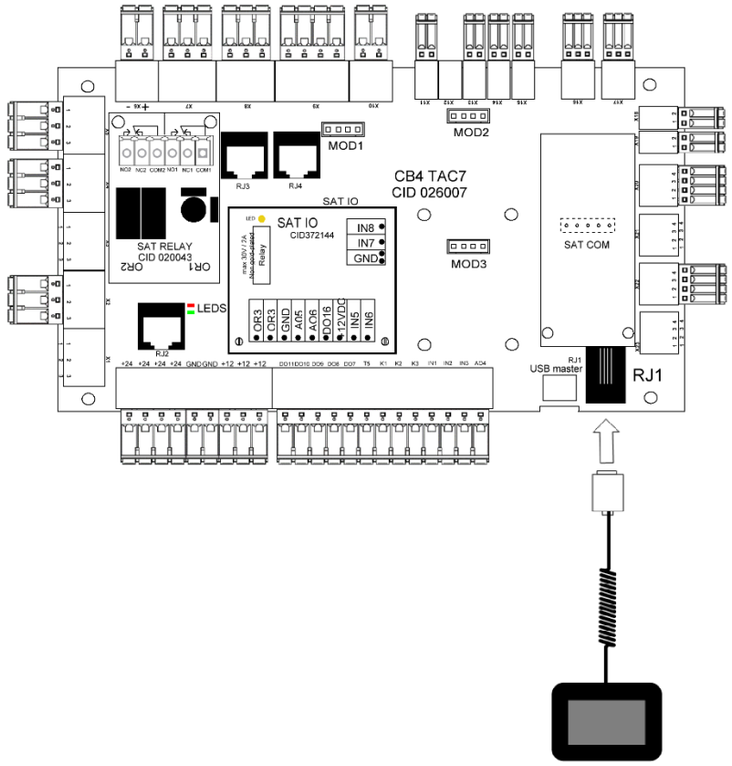
1. Alarm indicating a communication breakdown between the TAC7 circuit and TACtouch viewer
2. Alarm indicating a fan failure
3. Alarm on the pressure variation
4. Alarm report during reference pressure initialization
5. Alarm indicating the system cannot fulfil the set point
6. Alarm indicating a data failure in the control circuit
7. Fire Alarm
8. Alarm indicating a temperature sensor T1/T2/T3 failure
9. Alarm indicating failure on temperature sensor T7
10. Alarm indicating waterborne coils anti-frosting alert
11. Alarm indicating that the defrost process is active
12. Alarm indicating heat exchanger anti-frosting alert
13. Alarm indicating heat exchanger anti-frosting alert with possible fan(s) stop
14. Cold climate preheater Alarm
15. Alarm indicating a faulty position of the modulating by-pass relative to the commanded position
16. Alarm indicating an error of the heat exchanger rotation speed
17. Alarm indicating failure on temperature sensor T5
18. Alarm indicating that the comfort temperature is too low relative to set point temperature
19. Alarm indicating that the comfort temperature is too low in absolute
20. Alarm indicating that the comfort temperature is too high relative to set point temperature
21. Alarm indicating communication error for one of the Modbus pressure sensor
22. Maintenance Alarm
23. Service alarm
24. Drain pump alarm

Alarms

- **Trouble shooting:**

1. **Alarm indicating a communication breakdown between the TAC7 circuit and TACtouch viewer**

Beside the alarms generated by the TAC controller, the TACtouch indicates also communication error through dedicated icon in the header. In this case, follow these steps to diagnose the problem until that the communication has been recovered:



- The cable is well connected to TAC board on connector RJ1.
- If an extender cable is used, try to invert the 2 communication wires A+ and B- , and, if there is still no communication, eventually try with the original cable.
- Upgrade to last version (instruction manual and last version are available on Swegon web site).
- Configuration check: Go in Functions/Communication/Connection Setup check that Parameter "TACtouch master" = "Yes" and that parameter "TAC Modbus address" has the correct value (1 by default). This is the default configuration, however, for installation where the TACtouch is slave for the communication or where it has to use a specific address as slave, then enter the correct values for the corresponding parameters. Finally, check that parameters for bus RJ1 in in Functions/Communication/BUS correspond well to default or eventually changed configuration.
- Check that the contacts of the green connector at TACtouch back cover are well screwed.
- Replace the TACtouch or the control board TAC7: test the communication if possible with another TACtouch, or, in alternative, with TACsimulator software and adapter cable connected to RJ1 (see dedicated sheet in user wiring diagram on web site). Check that the communication is correct, if yes, the problem was linked to the original TACtouch which would need to be replaced, otherwise, so still no communication, then the control board TAC7 has to be replaced.

Alarms

- **Trouble shooting:**

2. Alarm indicating a fan failure

- Causes:
  - Failure of fan Fx. This problem is usually caused by the fan motor.

If not, the failure may be caused by an internal cable (control or power) or by the TAC circuit.

- Diagnostic:
  - if both fans are in alarms: check power supply on each fan.
  - If only one fan is in alarm, invert the fans control cables on the control board and reset the board: if the alarm text indicates now the other fan, the problem is located at the fan level originally indicated as faulty, or at its control cable itself or the wiring of this last one at fan connector side. Otherwise, if the alarm text indicates the same fan, then the control board is probably faulty due to input or output failure.

3. Alarm on the pressure variation

- Conditions:
  - Mode airflow control or demand control. Unit must have forward fans or backward fans with kit CA
  - External pressure switch connected on ADI2 (Supply) OR ADI3 input (Extract)
- Causes:
  - Pressure alarm setup in airflow control or demand control mode
  - External pressure switch connected on ADI2 OR ADI3 input has triggered

Alarms

- **Trouble shooting:**

4. **Alarm report during reference pressure initialization**
   - Conditions:
     - Mode Airflow control or Demand control: during the initialization of the pressure alarm.
     - Mode Pressure control: during the initialization of the reference pressure via airflow.
   - Causes:

   The reference pressure (Pa ref) cannot be identified and the fans are stopped. 4 possibilities:
   1. Actual airflow < requested airflow: The requested working point is 'too high' (too high pressure loss) for the maximal available pressure at the requested airflow for this fan.
   2. Actual airflow > requested airflow: the nominal airflow requested to initialize the pressure alarm cannot be reached because the lower limit of the fan's operating zone has been reached.
   3. Very unstable pressure (pumping).
   4. Assigned airflow not reached after 3 minutes.

   If this occurs during initializing an alarm pressure, there are 2 options:
   1. No action is taken: the control will operate without a pressure alarm.
   2. Corrective action is taken (change the working point to one located in the working zone of the fan, by reducing the pressure system, modifying the nominal airflow...) and restart the setup operation.

   If this occurs during initializing of the assignment pressure in pressure control mode: Corrective action must be taken (change the working point to one located in the working zone of the fan, by reducing the pressure system, modifying the nominal airflow ...) and restart the setup operation.

5. **Alarm indicating the system cannot fulfil the set point**

   The setpoint cannot be fulfilled because the upper or lower limit of the fan's working zone has been reached

Alarms

- **Trouble shooting:**

6. **Alarm indicating a data failure in the control circuit**
   Crucial data from the circuit board has been lost.
   Try a TOTAL RESET of the data in Functions/Base Settings. If still not resolved, order a new circuit board.

7. **Fire Alarm**
   - Conditions: Fire alarm input must be connected to a fire detection system.
   - Causes: Activation of fire alarm input, IN1, connected to a fire detection system. IN1 can be configured to work as NO open contact by default or as NC if configured so. If the contact will switch back to original non active state, the alarm "End of fire alarm" will be triggered provided that the parameter "Fire Alarm auto reset" is not set to "yes" in "Functions/ Alarm Settings /Fire alarm".

8. **Alarm indicating a temperature sensor T1/T2/T3 failure**
   One or more of the temperature sensors T1/T2/T3 connected to the TAC circuit and mounted on heat exchanger is defect or not connected. These sensors are needed for the bypass control and the anti-frost procedure.

9. **Alarm indicating failure on temperature sensor T4/T7/T8**
   - Conditions: External waterborne coil option (IBA or EBA/EBA-/EBA+-/EBAin)
   - Causes: temperature sensor located on the coil and connected to the TAC circuit is defective (open or short circuited) or not connected. temperature sensor to consider is T7 for reheating IBA or EBA, T8 for recooling or reversible, T4 for preheating .This is used to prevent frosting of the waterborne coil. In this case, as a safety measure, the 3-ways valve is opened and the circulator contact is closed.

10. **Alarm indicating waterborne coil anti-frosting alert**
    - Conditions: Only with waterborne internal coil (IBA), or external (EBA).
    - Causes: Indicates that the anti-frost protection temperature of the waterborne coil is lower than 4°C (configurable value, it is important to reduce this Setting for EBAin coil if an antifreeze is in the fluid). The 3-ways valve is automatically opened at 100% for 15 minutes and the heating demand contact is closed (output DO7). If the AHU is running, the alarm is sent after 2 minutes for a preheater and immediately for the others; if the AHU is not running, the alarm is sent after 5 minutes.

Alarms

- **Trouble shooting:**

11. **Alarm indicating that the defrost process is active**
    - Conditions: Unit with counter flow heat exchanger.
    - Causes:
        - The ice forming inside of the plate heat exchanger is generating a pressure drop that is too high for the current airflow. This detection requires a Modbus pressure sensor placed on the heat exchanger.
        - When the previous detection is not available, the supply temperature is checked and if it falls below 11°C, it is considered that it is due to the ice that reduces the heat exchanger efficiency.

12. **Alarm indicating heat exchanger anti-frosting alert**
    - For unit with counter flow heat exchanger:
        - With antifrost protection of the heat exchanger by supply airflow reduction - associated alarm code: A.21: after the temperature of exhaust air at the exchanger output (T3) becomes lower than 5°C, the setpoint for the supply airflow is reduced in a linear way from 100% to, at 1°C, 33% (CA, TQ, LS mode) or 50% (CP mode) respect to the current setpoint. High and low temperatures of 5°C and 1°C are configurable values.
        - With preheating option (KWin or EBAin) - associated alarm code: A.10: Once 100% of the power is output to the preheater and T3 (exhaust temperature) is lower than anti-frost temperature (temperature AF, 1°C by default), then both flows will be reduced by steps every same intervals until that T3 will exceed temperature AF or that 33% of the airflows before reduction are reached. In this last case, a defrost process is entered for 30 minutes: preheater and Supply will be stopped while exhaust will be at its level before reduction. After the defrost period, the antifrost process will restart with preheater at 100% and both flows at 33%. During airflow reduction, if T3 becomes higher than temperature AF, the flows will increase at same rate than for reduction.
    - For unit with rotary heat exchanger - associated alarm code: A.23: When external temperature (T1 sensor) is lower than the anti-frost temperature (temperature AF, -9°C by default), the rotation speed of the heat exchanger will decrease (2RPM by default, configurable in Functions / Heat/cool recovery / Anti-freeze) to avoid any risk of frosting on it.
    - After that T1 ≥ temperature AF during 5 minutes, then the rotary will turn back at nominal rotation speed.

Alarms

- **Trouble shooting:**

13. **Alarm indicating heat exchanger anti-frosting alert with possible fan(s) stop**
    - Conditions: PX units with
        - electrical preheating (KWin) or waterborne preheating (EBAin)
        - or modulating bypass configured in antifrost modality.
        - or antifrost protection with supply air flow reduction
    - Causes:
        - With KWin or EBAin option - associated alarm code: A.11 : in certain air temperature conditions as measured on the exhaust airflow after the heat recovery, indicating that the internal electrical KWin coil or external waterborne preheater (EBAin) has reached its limit, the TAC control can take over to guarantee the anti-frost function. If temperature < -5°C during 5 minutes, fans are stopped.
        - With modulating bypass - associated alarm code: A.11: in frost protection, this alarm indicates that the exhaust air temperature at the exchanger output (T3 sensor) has not exceeded 1°C during 15 minutes after that the bypass has been opened at 100%. The maximum opening is limited to the one that allows 50% of the airflow to bypass the heat exchanger when there is the pressure sensor for defrost. Fans are stopped and a reset of alarms is necessary.
        - With antifrost protection with supply air flow reduction - associated alarm code: A.22: when the exhaust air temperature at the exchanger output (T3 sensor) falls under 1°C (configurable parameter), the supply fan is stopped and it will turn again if T3 becomes greater than 2°C for more than 5 minutes. This additional protection can be disabled in the alarm function.

14. **Cold Climate Preheater alarm**
    - Conditions: Presence of Cold Climate Preheater.
    - Causes:
        - Alarm indicating that, during start-up, timeout for cold climate preheater to reach setpoint temperature on fresh air temperature after the external cold climate preheater
        - Alarm indicating that, with fans running, the fresh air temperature after the external cold climate preheater was too low for too long time

Alarms

- **Trouble shooting:**

15. **Alarm indicating a faulty position of the modulating by-pass relative to the commanded position**
    - Conditions: PX units with modulating bypass
    - Causes: This alarm indicates that the modulating bypass has not reached the ordered position within 10 seconds. The most common reason for this is a damaged position sensor on the bypass actuator, and this must be replaced. Other reasons may be that the control board output is damaged, implying the replacement of the board, or a mechanical blocking verified by a visual inspection of the bypass.
    - Diagnostic : Stop the unit, do an alarm reset, check and eventually correct actuator wiring to the control board and then check that the bypass can move physically: connect IN3 to +12V to force the bypass to open.
        - If the bypass stays in close position:
            - check if there is some mechanical obstruction that makes the actuator stuck, otherwise:
            - Either the actuator must be replaced
            - Or the control board must be replaced. NB: on LP units, try first to replace SAT RELAY.
        - If the bypass opens completely:
            - Do several Close/open cycle using IN3 to try to reproduce the alarm and check bypass position in Functions/ Heat / cool recovery /Status. If the problem cannot be reproduced, try with fans boosting.
            - Either the actuator must be replaced.
            - Or the control board must be replaced. NB: on LP units, try first to replace SAT RELAY.

Alarms

- **Trouble shooting:**

16. Alarm indicating an error of the heat exchanger rotation speed

A – Visual mechanical check :

1. Check good tension of the green rubber belt in the central part of the unit. Eventually replaced if broken.
2. Check the good coupling between motor shaft and pulley: eventually screw the 2 screws.
3. Check that the wires of the motor are not damaged (8 wires: red, red-white, black, black-white, green, green-white, yellow, yellow-white).

B – Further diagnostic

1. Ensure that the control board TAC is at last version available on web site.
2. Check the current RPM of the rotor respect to the setpoint which is in normal condition (no freecooling and no antifrost protection), 10 RPM.
3. If the actual speed is lower than 9,8 RPM (but >0), then decrease parameter "rotor speed at 10V" in function "Heat/cool recovery" until that the actual speed is between 9,8 and 10,2 RPM.
4. If the actual speed is higher than 10,2 RPM, then increase parameter "rotor speed at 10V" in function "Heat/cool recovery" until that the actual speed is between 9,8 and 10,2 RPM.
5. Feedback of rotor: check input for rotor speed (see wiring diagrams): closed when magnet on the rotor in front of magnetic switch. Otherwise, open.
    5.1. If not, check directly the impedance at the sensor output: if 0 Ohm when magnet in front and infinite when far, then the sensor is correct and the control board has to be replaced. Otherwise, replace magnetic sensor.
6. Output rotor speed control from TAC main board: check that the wire from DO2 goes well to stepper driver PWM1 input (see following point).
7. check the stepper driver:
    7.1 Check previous wire from control board DO2 is well connected to «PWM1» input.
    7.2 Check +24V DC at GND +24V connectors of stepper driver. If not, check the 24V DC power supply and the cable between it and the driver.
    7.3 check electrical connection between driver and motor.
    7.4 if the red led is blinking on stepper driver, that means that there is an alarm.
    Check first of all that the support of the stepper motor is well connected to the rotor frame with a yellow green protective earth cable.
        7.4.1 If not, it must be connected, and it is safer to replace the stepper driver and the control board.
        7.4.2 If yes, try with another driver. If it still blink, try with another motor.

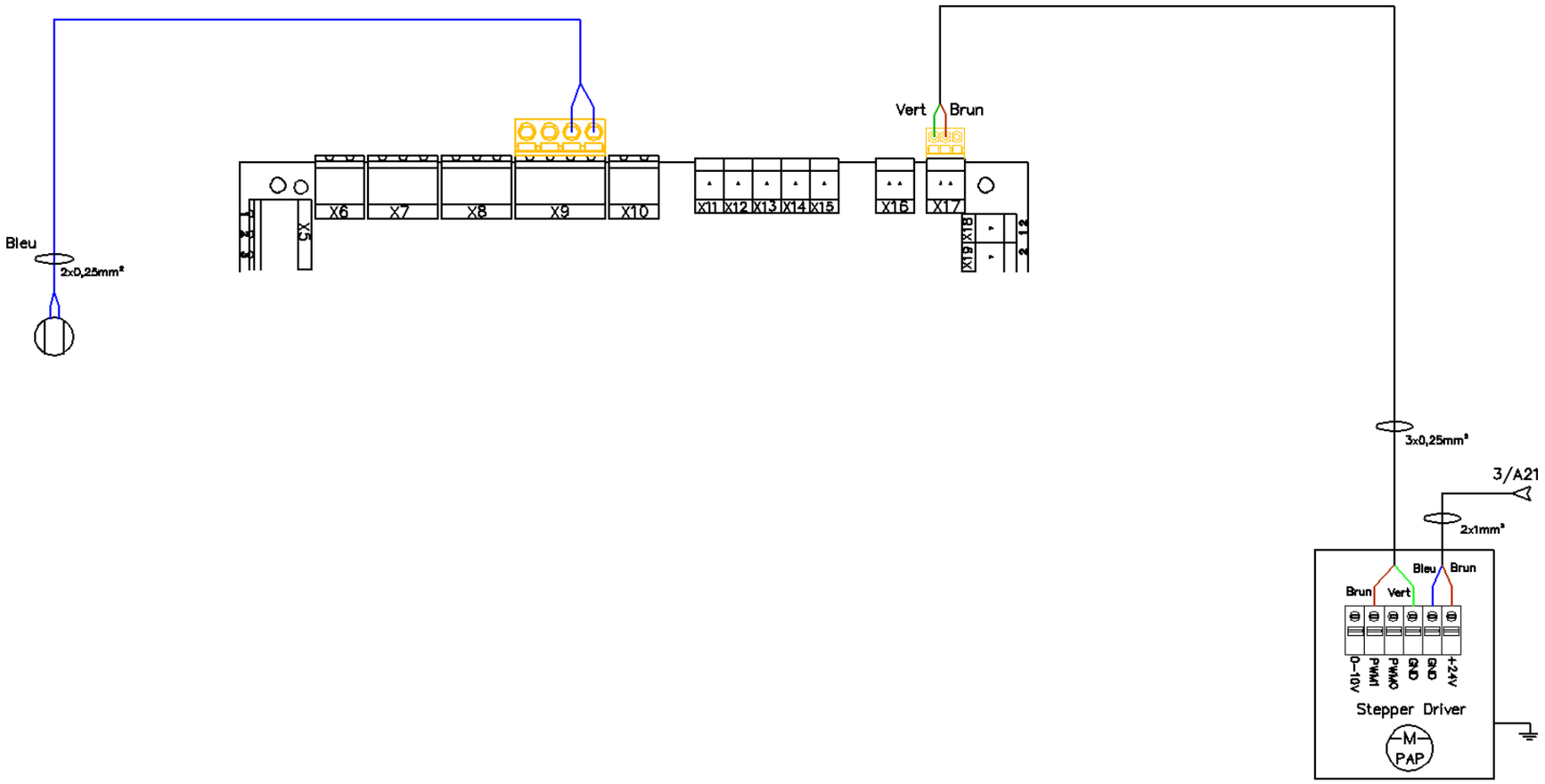
N.B.: when the stepper driver is replaced, dip switches must be placed on same position than before. Only DIP SWITCH 1 has effect and it is used for the direction of rotation.

Alarms

- **Trouble shooting:**

16. Alarm indicating an error of the heat exchanger rotation speed

Diagrams:



Alarms

- **Trouble shooting:**

17. **Alarm indicating failure on temperature sensor T5**
    - Conditions: only with reheating, recooling or free cooling with heat rotary or modulating bypass option.
    - Causes: temperature sensor T5 located in the supply duct and connected to the TAC circuit is open, or short-circuited. This sensor is used to regulate the reheating or recooling function in the case of comfort temperature control on T5 or to control the high and low thresholds to limit the supply air temperature in the case of comfort temperature control on T2.

18. **Alarm indicating that the comfort temperature is too low relative to set point temperature**
    - Conditions: Only with reheating option
    - Causes: The comfort temperature setpoint cannot be reached (actual temperature lower than setpoint during 15 minutes, or 30 minutes if comfort on T2 instead of T5, while post heating is at maximum)

19. **Alarm indicating that the comfort temperature is too low in absolute**
    - Conditions: Only with post heating or cooling option.
    - Causes: This alarm indicates that the supply temperature (T5) is lower than 5°C. The fans are stopped for 1 minute. The alarm is configurable through dedicated parameter and is disabled by default.

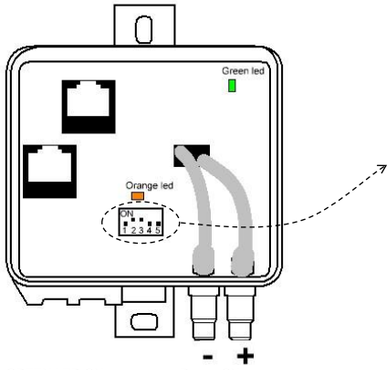
20. **Alarm indicating that the comfort temperature is too high relative to set point temperature**
    - Conditions: Only with post cooling option.
    - Causes: The comfort temperature setpoint cannot be reached (actual temperature lower than setpoint during 15 minutes, or 30 minutes if comfort on T2 instead of T5, while post cooling is at maximum).

Alarms

- **Trouble shooting:**

21. Alarm indicating communication error for one of the Modbus pressure sensor

- Conditions: Unit with at least one configured Modbus pressure sensor.
- Causes: One or more of the Modbus pressure sensors give too much communication errors. This in turn can come from:
  - The physical absence of one of the configured sensor.
  - One of the sensors is not powered on: check “ON” led of all configured sensors. See installation manual of Modbus pressure sensor.
  - Faulty cable
  - One of the sensors address is not correctly set: check the setting wheel position for each configured sensor according to its function. See diagnostic here below.
- Diagnostic:
  - Check in TACtouch the screen with the communication sensor errors in Functions/Inputs/outputs/Pressure – Modbus Sensors : the Modbus pressure sensor which is in alarm will have its error counter that increases. Once identify, check first of all that it is well present otherwise, it will be necessary to modify the configuration to tell the control board that it is not present.
  - If the sensor is well present, check that its address is correctly set on it. See address settings.
  - Finally, check it’s status led: green led on, communication orange blinking. If status led are different, then it may be due to the cable or to sensor itself that is damaged. See wiring.

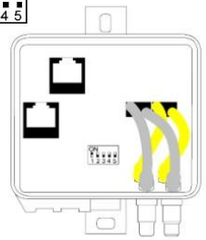


GREEN LED ON: Power ON
GREEN LED OFF: Power OFF

ORANGE LED Flashing: Valid Modbus Communication
ORANGE LED OFF: Invalid Modbus Communication

Mode	Supply	Exhaust
CP	5	6
CA*	1	2**
Defrost*		C
Filters*	3	4**

* = factory installed
** = if 2 physical sensors and not 1 dual (with dual sensor, exhaust pressure measurement uses bottom row of pipes, The ones highlighted in yellow in the picture here at right side)



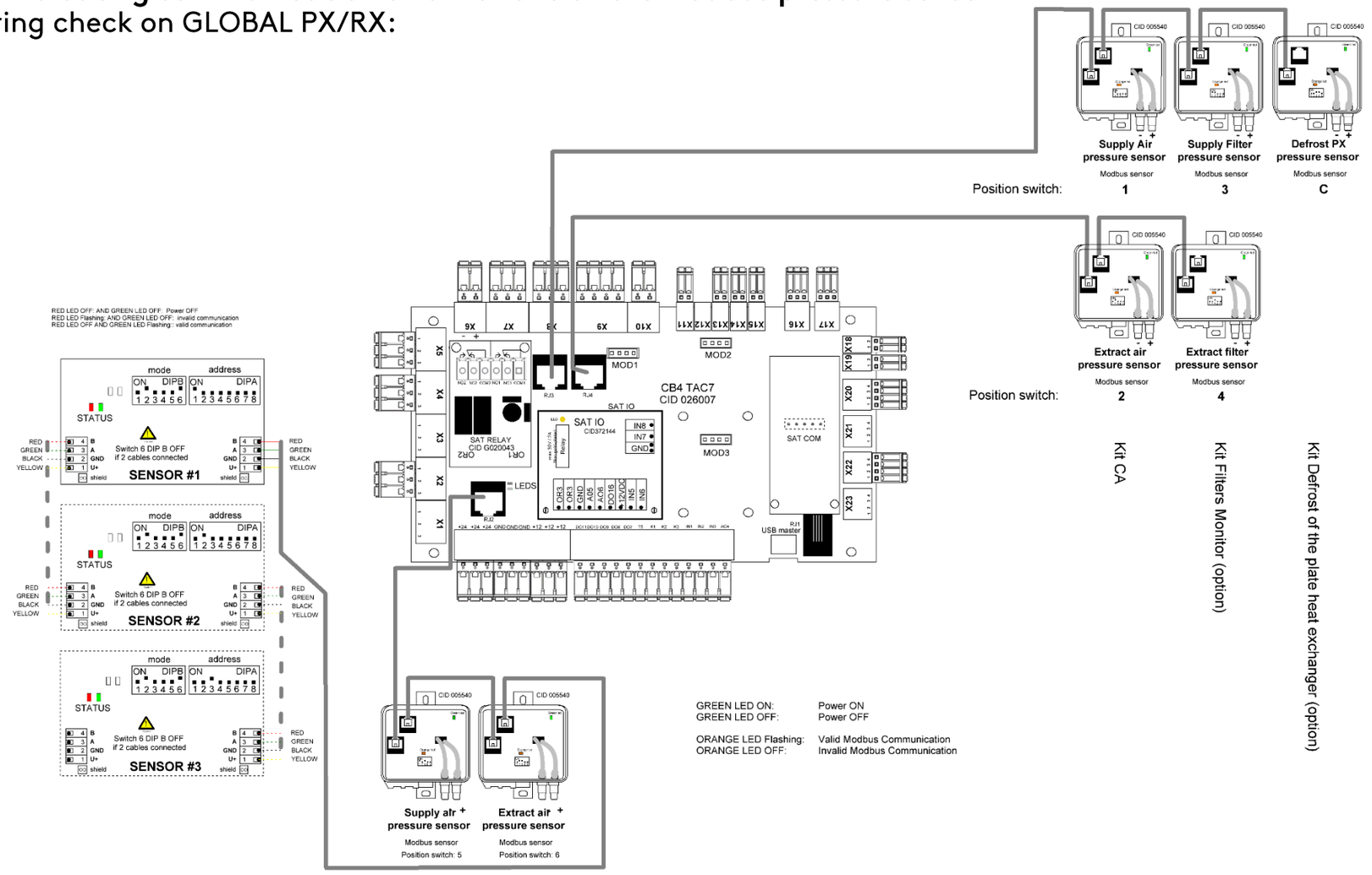
TAC7

Alarms

- **Trouble shooting:**

21. Alarm indicating communication error for one of the Modbus pressure sensor

- Wiring check on GLOBAL PX/RX:



Demand control IAQ Modbus OR CP MODE + COM SENSORS (option)

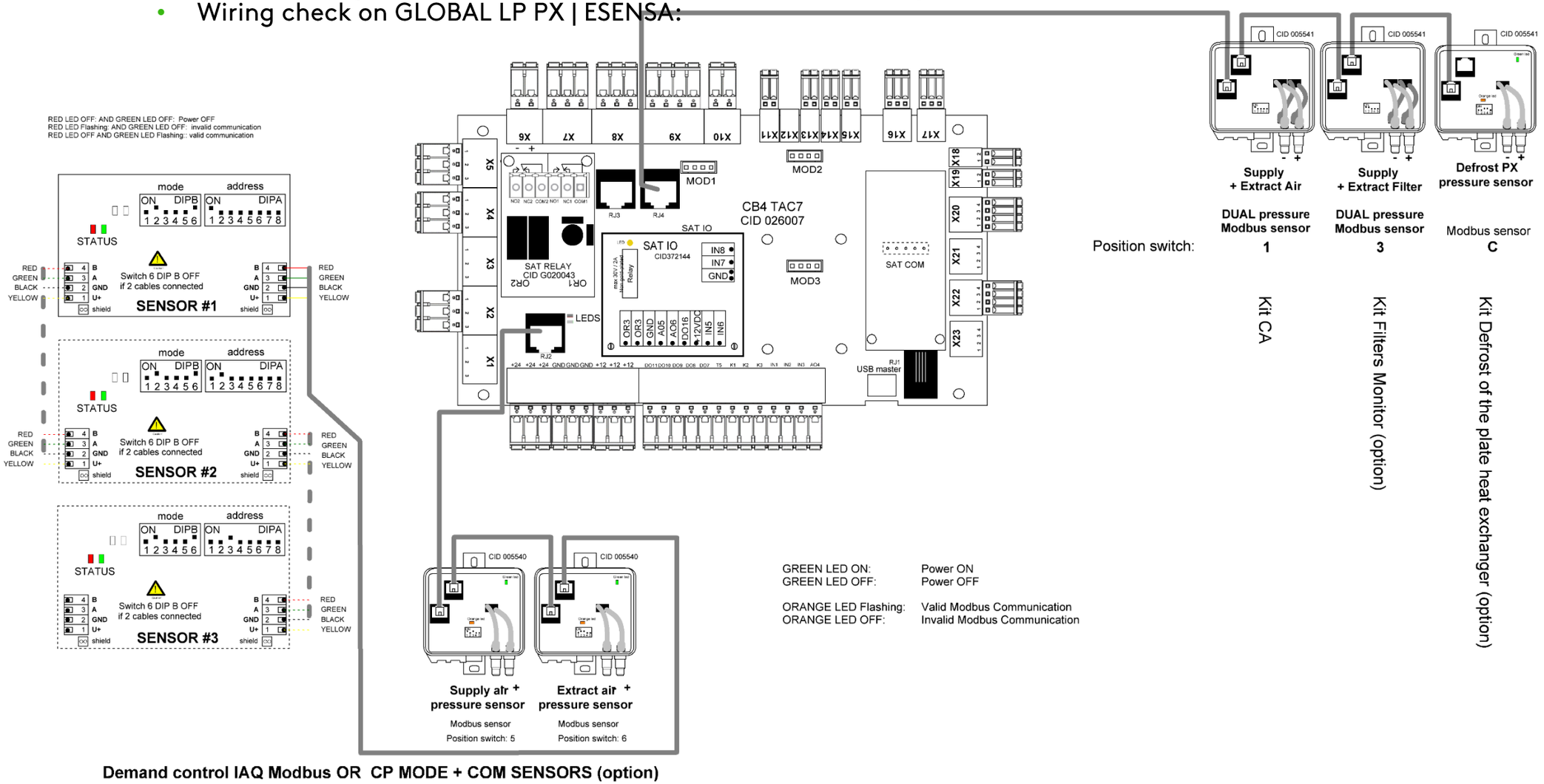
TAC7

Alarms

- **Trouble shooting:**

21. Alarm indicating communication error for one of the Modbus pressure sensor

- Wiring check on GLOBAL LP PX | ESENSA:



Demand control IAQ Modbus OR CP MODE + COM SENSORS (option)

TAC7

Alarms

- **Trouble shooting:**

22. Maintenance Alarm

Alarm indicating that the hours limit for the minor or major maintenance have been reached

- Conditions: The hours limit for minor or major maintenance must be configured with a value greater than 0.
- Causes: The hours limit for the minor or major maintenance has been reached.

For minor maintenance, the instructions in the manual for the 3 months maintenance should be followed. Mainly, the filters should be cleaned or replaced.
Reset the hours for minor maintenance after this operation, this will reset automatically the alarm and trigger it again after the same period.

For major maintenance, the instructions in the manual for the 12 months maintenance should be followed. Reset the hours for major maintenance after this operation, this will reset automatically the alarm and trigger it again after the same period. Reset also minor maintenance hours.

23. Service alarm

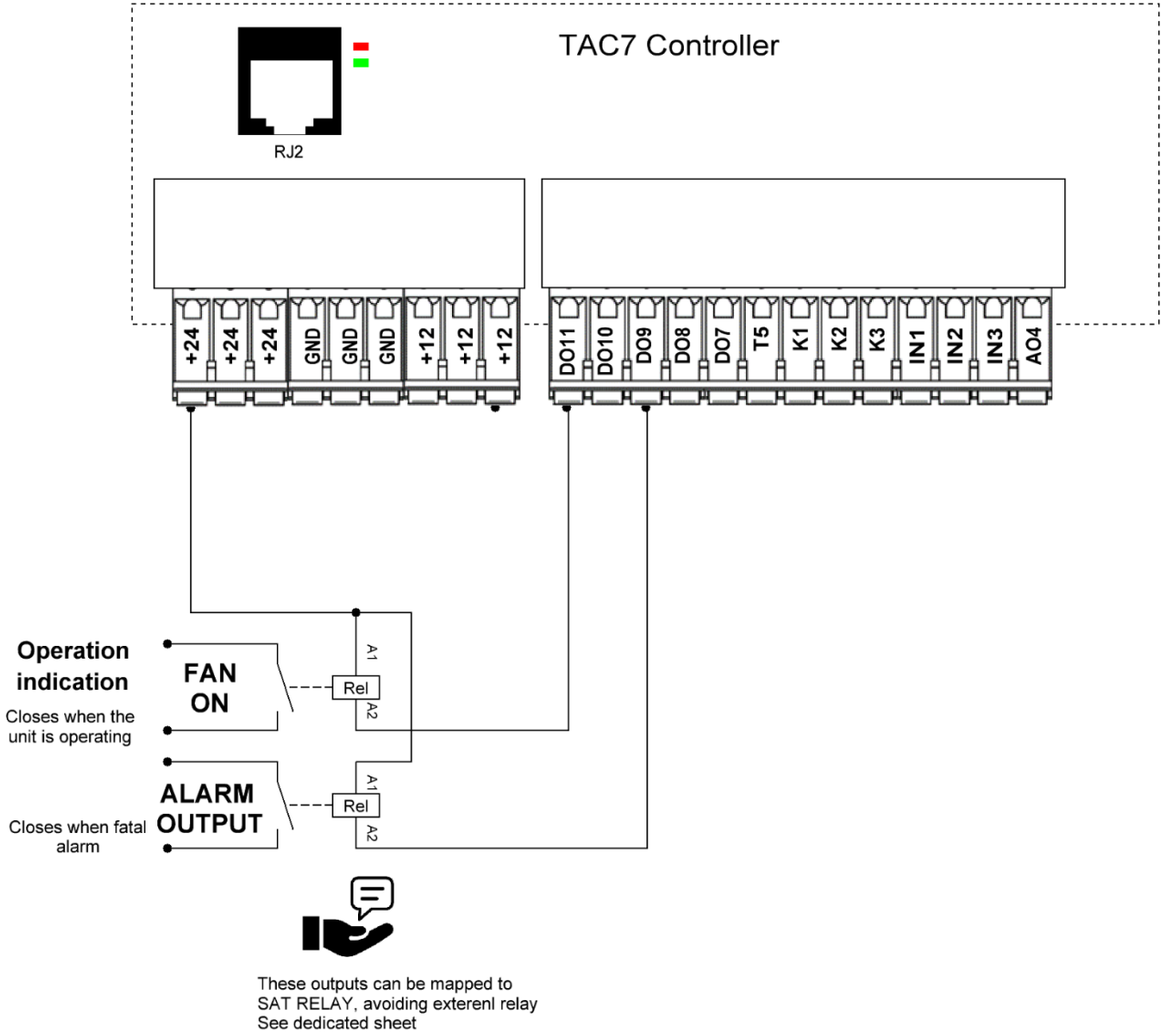
- Conditions: the running hours feature must be enabled.
- Causes:
  - SERVICE ALARM: the fan operating time (in hours) has exceeded the configurable threshold
  - STOP FAN: the fan operating time (in hours) has exceeded the configurable threshold. This alarm stops the fans

24. Drain pump alarm

- Conditions: Only for “LP” (Low Profile) model or for all models when an external battery is mounted with a condensate pump.
- Causes: The level of condensate is higher than a set Setting (approx. 1.5 cm). It can also be activated if the pump is not present or defective

Alarms

- Operation: with TACtouch viewer, see section “Alarms in TACtou[illegible]”
- Wiring



TAC7

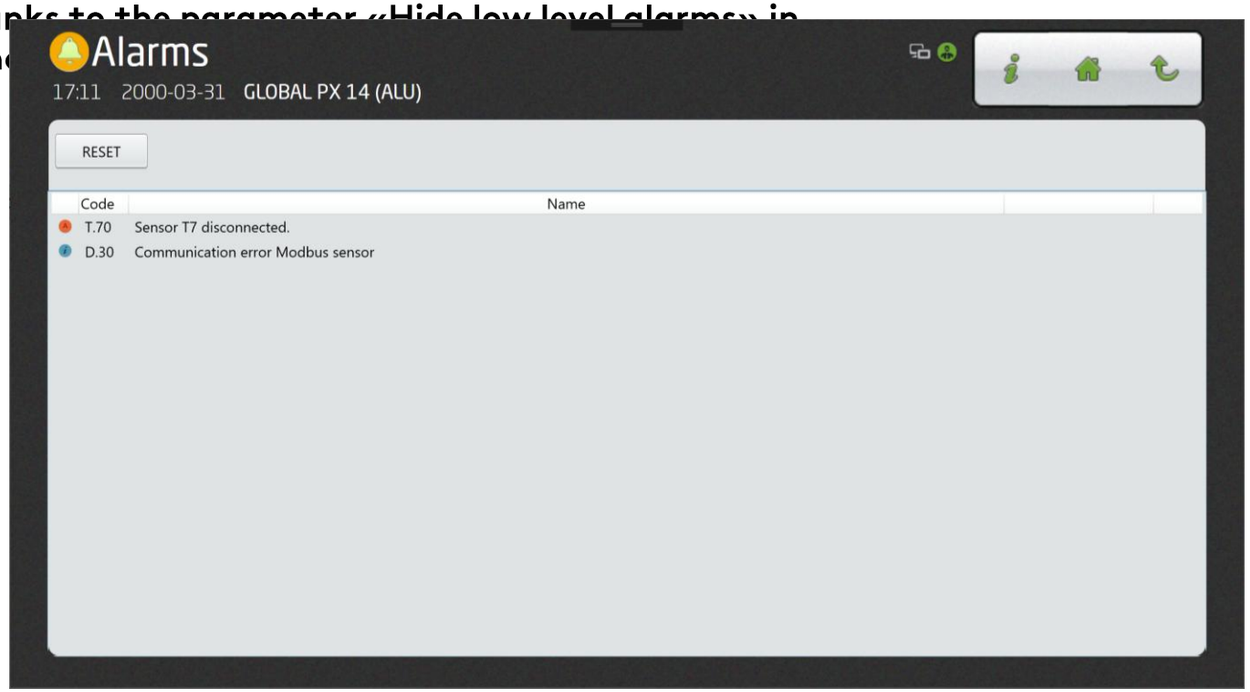
Alarms in TACtouch

The following tables summarize the error codes of alarms as reported by the TACtouch viewer together with the associated describing text. The alarm types as defined in the alarms section is indicated for each code.

- Level alarm indication:
  - level 3, highest: severe alarm, represented by dedicated symbol on left side of Alarms button in Dashboard and also in the alarms screen list at the corresponding row for this alarm
  - level 2: warning, represented by dedicated symbol on right side of Alarms button in Dashboard and also in the alarms screen list at the corresponding row for this alarm
  - level 1 and 0: information, represented by dedicated symbol on right side of Alarms button in Dashboard and also in the alarms screen list at the corresponding row for this alarm.

Lowest 0 level alarms may be hidden thanks to the parameter «Hide low level alarms» in Guides/Commissioning settings or in Fun

- Alarm Screen: displayed thanks to Alarms button in Dashboard, shows:
  - List of active alarms with their level indicator, description and start time-date. Possibility to reset active alarms.
  - List of historic last 70 alarms with their level indicator, description and start/end time-date. Possibility to reset alarms history.



TAC7

Alarms in TACtouch

Code	Alarm description	Type	Level	AI def Output	AI dPA Output	LED ALARM	Auto Reset	Fans
A.10	Pre-heating - Reduction.	12	2	/	/	ON	YES	reduction on both fans by steps
A.11	Pre-heating - Off.	13	3	ON	/	ON	NO	Stopped
A.20	Defrost	11	1	ON	/	ON	YES	Supply stopped
A.21	Anti-freeze - Reduced supply air flow (PX).	12	1	/	/	ON	YES	reduction of supply fan linearly
A.22	Anti-freeze – Stop supply air flow (PX).	13	3	/	/	ON	YES	Supply stopped
A.23	Anti-freeze - Reduced rotor speed (RX).	12	1	/	/	ON	YES	/
A.40	Anti-freeze protection of the internal reheater (IBA).	10	3	ON	/	ON	NO	Stopped
A.41	Anti-freeze protection of the waterborne reheater (EBA+).	10	3	ON	/	ON	NO	Stopped
A.42	Anti-freeze protection of the waterborne recooler (EBA-).	10	3	ON	/	ON	NO	Stopped
A.43	Anti-freeze protection of the waterborne reversible coil (EBA+-).	10	3	ON	/	ON	NO	Stopped
B.11	Fan 1 failure.	2	3	ON	/	ON	NO	Stopped
B.12	Fan 2 failure.	2	3	ON	/	ON	NO	Stopped
B.13	Fan 3 failure.	2	3	ON	/	ON	NO	Stopped
B.14	Fan 4 failure.	2	3	ON	/	ON	NO	Stopped
B.20	Position of the modulating bypass incorrect.	15	3	ON	/	ON	NO	Stopped
B.30	Heat exchanger rpm incorrect.	16	3	ON	/	ON	NO	Stopped
D.10	Program Error.	6	3	ON	/	ON	NO	Stopped
D.20	Data Error.	6	3	ON	/	ON	NO	Stopped
D.30	Modbus sensor communication error	21	1	/	/	ON	YES	/
E.10	Alarm cold climate preheater setpoint at start-up	14	1	ON	/	ON	YES	/
E.11	Alarm cold climate preheater setpoint with fans on	14	1	ON	/	ON	YES	/
F.10	Fire alarm.	7	3	ON	/	ON	NO	The fans run by default in the event of a fire alarm at the configured fixed airflows. The fans may be forced to stop in case of fire alarm thanks to contact IN7 and IN8 for supply and exhaust respectively (need to be closed). These contacts are available on optional satellite board SAT IO.
F.11	End of the fire alarm.	7	3	ON	/	ON	NO*	

*Unless parameter “Fire Alarm auto reset” is set in Functions/Alarm settings

Alarms in TACtouch

Code	Alarm description	Type	Level	AI def Output	AI dPA Output	LED ALARM	Auto Reset	Fans
M.10	Maintenance 3 months.	22	1	/	/	ON	Via reset of hours	/
M.11	Maintenance 12 months.	22	1	/	/	ON	Via reset of hours	/
M.21	Operating hours.	23	2	ON	/	ON	No and reset of hours needed	/
M.22	Operating hours - AHU off.	23	3	ON	/	ON	No and reset of hours needed	Stopped
P.10	Pressure alarm - Supply air.	3	2	/	ON	ON	YES	/ (stop if the status has been changed in Functions/Filters/Pressure alarm)
P.15	Pressure alarm - Extract air.	3	2	/	ON	ON	YES	
P.20	Initialization of the reference pressure - Unstable supply air pressure.	4	2	ON	/	ON	NO	Stopped
P.21	Initialization of the reference pressure - Unstable extract air pressure.	4	2	ON	/	ON	NO	Stopped
P.22	Initialization of the reference pressure - Supply air flow too low.	4	2	ON	/	ON	NO	Stopped
P.23	Initialization of the reference pressure - Extract air flow too low.	4	2	ON	/	ON	NO	Stopped
P.24	Initialization of the reference pressure - Supply air flow not reached.	4	2	ON	/	ON	NO	Stopped
P.25	Initialization of the reference pressure - Extract air flow not reached.	4	2	ON	/	ON	NO	Stopped
P.26	Initialization of the reference pressure - Supply air flow too high - Min. limit of the motor.	4	2	ON	/	ON	NO	Stopped
P.27	Initialization of the reference pressure - Extract air flow too high - Min. limit of the motor.	4	2	ON	/	ON	NO	Stopped
R.10	Condensate tray full.	24	3	ON	/	ON	YES	Stopped
W.10	Software upgrade of SAT COM success.	25	1	/	/	/	YES	/
W.11	Software upgrade of SAT COM failure.	25	2	/	/	ON	YES	/
U.10	User defined alarm 1	26						
U.11	User defined alarm 2	26					User defined	

Alarms in TACtouch

Code	Alarm description	Type	Level	AI def Output	AI dPA Output	LED ALARM	Auto Reset	Fans
S.11	“Constant Pressure” fan 1 - Pressure too low - Maximum air flow reached.	5	2	/	/	ON	YES	/
S.12	“Constant Pressure” fan 1 - Pressure too high - Minimum air flow reached.	5	2	/	/	ON	YES	/
S.13	“Constant Pressure” fan 3 - Pressure too low - Maximum air flow reached.	5	2	/	/	ON	YES	/
S.14	“Constant Pressure” fan 3 - Pressure too high - Minimum air flow reached.	5	2	/	/	ON	YES	/
S.20	“Demand control” fan 1 - Air flow too low - Reduce the pressure on this fan.	5	2	/	/	ON	YES	/
S.21	“Demand control” fan 1 - Air flow too high - Minimum limit of the motor reached.	5	2	/	/	ON	YES	/
S.22	“Demand control” fan 2 - Air flow too low - Reduce the pressure on this fan.	5	2	/	/	ON	YES	/
S.23	“Demand control” fan 2 - Air flow too high - Minimum limit of the motor reached.	5	2	/	/	ON	YES	/
S.24	“Demand control” fan 3 - Air flow too low - Reduce the pressure on this fan.	5	2	/	/	ON	YES	/
S.25	“Demand control” fan 3 - Air flow too high - Minimum limit of the motor reached.	5	2	/	/	ON	YES	/
S.26	“Demand control” fan 4 - Air flow too low - Reduce the pressure on this fan.	5	2	/	/	ON	YES	/
S.27	“Demand control” fan 4 - Air flow too high - Minimum limit of the motor reached.	5	2	/	/	ON	YES	/
S.30	“Constant Air Flow” fan 1 - Air flow too low - Reduce the pressure on this fan.	5	2	/	/	ON	YES	/
S.31	“Constant Air Flow” fan 1 - Air flow too high - Minimum limit of the motor reached.	5	2	/	/	ON	YES	/
S.32	“Constant Air Flow” fan 2 - Air flow too low - Reduce the pressure on this fan.	5	2	/	/	ON	YES	/
S.33	“Constant Air Flow” fan 2 - Air flow too high - Minimum limit of the motor reached.	5	2	/	/	ON	YES	/
S.34	“Constant Air Flow” fan 3 - Air flow too low - Reduce the pressure on this fan.	5	2	/	/	ON	YES	/
S.35	“Constant Air Flow” fan 3 - Air flow too high - Minimum limit of the motor reached.	5	2	/	/	ON	YES	/
S.36	“Constant Air Flow” fan 4 - Air flow too low - Reduce the pressure on this fan.	5	2	/	/	ON	YES	/
S.37	“Constant Air Flow” fan 4 - Air flow too high - Minimum limit of the motor reached.	5	2	/	/	ON	YES	/
S.40	Pressure alarm from Pressure Switch - Filter Supply.	3	2	/	ON	ON	YES	/
S.41	Pressure alarm from Pressure Switch - Filter Extract.	3	2	/	ON	ON	YES	/
S.50	reheating - temperature of the supply air too low.	18	0	/	/	ON	YES	/
S.60	recooling - temperature of the supply air too high.	20	0	/	/	ON	YES	/
S.65	Supply air temperature too low - Fan stopped.	19	3	ON	/	ON	NO	Stopped
S.70	0-10V signal < Vlow - Fan stopped.	-	0	/	/	ON	YES	/ (stop if setting has been changed in Functions/Air flow/Stop fans outside limits)
S.71	0-10V signal > Vhigh - Fan stopped.	-	0	/	/	ON	YES	

Alarms in TACtouch

Code	Alarm description	Type	Level	AI def Output	AI dPA Output	LED ALARM	Auto Reset	Fans
T.10	Sensor T1 disconnected.	8	3	ON	/	ON	NO	Stopped
T.11	Sensor T1 short circuited.	8	3	ON	/	ON	NO	Stopped
T.20	Sensor T2 disconnected.	8	3	ON	/	ON	NO	Stopped
T.21	Sensor T2 short circuited.	8	3	ON	/	ON	NO	Stopped
T.30	Sensor T3 disconnected.	8	3	ON	/	ON	NO	Stopped
T.31	Sensor T3 short circuited.	8	3	ON	/	ON	NO	Stopped
T.40	Sensor T4 disconnected.	9	3	ON	/	ON	NO	Stopped
T.41	Sensor T4 short circuited.	9	3	ON	/	ON	NO	Stopped
T.50	Sensor T5 disconnected.	17	3	ON	/	ON	NO	Stopped
T.51	Sensor T5 short circuited.	17	3	ON	/	ON	NO	Stopped
T.70	Sensor T7 disconnected.	9	3	ON	/	ON	NO	Stopped
T.71	Sensor T7 short circuited.	9	3	ON	/	ON	NO	Stopped
T.80	Sensor T8 disconnected.	9	3	ON	/	ON	NO	Stopped
T.81	Sensor T8 short circuited.	9	3	ON	/	ON	NO	Stopped

BOOT LOADER

The bootloader is a software feature that enables to update the software version of the control board.

By default, the configuration will be maintained but it is possible to set an option that reset all the parameters during the upgrade.

- **Hardware requirements:**
  - 1 PC laptop
  - If using SAT MODBUS:
    - 1 sat Modbus
    - 1 USB-RS485 cable converter.
  - Using USB C port: standard USB cable typ

Possible from vs 1.0.9.66 and bootloader v2.01!!!

Software: firmware can be downloaded individually on Swegon website.

- However, it is recommended to download the last installation package of TACsimulatorV2, which contains last TAC7 and TACtouch firmware. Then the function “Software” allows an easy way to download the software to the control

TAC7