HP AIR/WATER

WITH REGULATION

ACOND® THERM

Acond PRO Errors diagnostic

1. Documentation validity

The instruction specified herein are valid for the **ACOND PRO®** air/water and ground/water heat pumps EVI, PRO, and OPT with the **ACOND® THERM** regulation.

If these obligations are not followed during the installation, operation and maintenance, then the obligations of **ACOND a.s.** stemming from the terms of the warranty shall cease to apply.

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2. Documentation designation

This document is for the installation companies and service companies! Installation, maintenance and repairs can be made only by authorized technicians.

3. The most often HP errors and their diagnostics

3.1 EEV (electronic expansion valve), superheat (SH)

- Superheat is defined by the difference between the evaporating temperature (LP-low pressure) and the suction temperature, most commonly SH=6K
- If the superheat is negative or low (less than 2K), the compressor sucks liquid, compressor damage can occur
- If the superheat is high, the compressor sucks small amount of the refrigerant, does not lube itself and overheats. The heating capacity drops.
- High superheat is caused by almost closed EEV. If the EEV is sufficiently open and the superheat is still high then the refrigerant is leaking.
- If the superheat oscillates, the reason is probably frozen outside unit (the bottom part of the heat pump can be frozen, it mixes colder refrigerant with hotter refrigerant, the refrigerant temperature oscillates and so does the superheat)
- **EEV is opening** – The SH drops, the low pressure grows, the compressor sucks more refrigerant. During big EEV opening there is a risk of liquid in the compressor.
- **EEV is closing** – The SH grows, the low pressure drops, high pressure grows (the difference between LP and HP is getting bigger), the compressor's displacement temperature grows and it sucks less refrigerant
- **EEV test of function during compressor running:**
    - open the EEV by 10% - the SH must drop, the LP grows
    - close the EEV by 10% - the SH must grow, the LP drops

3.2 Heating performance loss

- Check the function of the check valve and the EEV bypass – during the heating the refrigerant must not flow through the bypass (check the temperature before and after reverse valve)
- The compressor or the fan is not running, the refrigerant is leaking, the EEV is not spraying (the LP is not dropping)
- The filtrdehydrator is partially clogged during the heating (not very often) – it would cause bigger difference in tube's temperature before and after the filtrdehydrator – the measurement shall be done after at least 3 to 5 minutes after running (1°C to 2°C is ok). The partially clogged filtrdehydrator can be the reason for EEV bigger opening (there is less refrigerant in the circuit, the regulation opens the EEV so the refrigerant's volume gets bigger but the refrigerant is blocked by clogged filtrdehydrator)

3.3 High temperature at compressor's displacement

- If the temperature at the compressor's displacement is high, the flow through the compressor may be low. The temperature at the displacement shall be 20°C to 30°C higher than the high pressure temperature.

3.4 Fault A16 – low flow through the plate exchanger

- Clean the water filter in the primary heating circuit
- Wrongly placed temperature sensor at the water reverse to HP
- Slow water temperature sensor after the compressor's start (long heating circuit – we recommend to extend the time for the fault announcement – the parameter AL02, or extend the time of circulation pump running before the ventilator's start – parameter CO05)
- One of the closing valves is closed
- Aired heating system, weak or broken circulation pump, low circulation pump's performance is set

3.5 Fault A01 – refrigerant's high pressure

- Low or no flow of water through the plate exchanger, possible combination with A16
    - clogged water filter in plate exchanger's circuit – clean it
    - one of the closing valves is closed
    - weak or broken circulation pump, low pump's performance is set
- Too high temperature of water at the heat pump's outlet – check the desired heating water temperature, check the heating water reverse temperature sensor, check the heating system
- The filtrdehydrator is partially clogged during the heating (not very often) – it would cause bigger difference in the tube's temperature before and after the filtrdehydrator.
- Too big difference between the plate exchanger's outlet temperature and the condensation temperature (HP – high pressure) – **ideal value of the difference is 1°C, max is 3°C**. It can be caused by the refrigerant's (applies for R407 and R410) leakage and it's refill – refrigerant needs to be changed while the compressor is off.

3.6 Fault A02 – low pressure, A06 – low suction temperature (evaporator), A13 – too many defrosts

The difference between the air temperature and the low pressure is circa 2°C to 12°C. Usually it is around 4°C to 8°C – lower the air temperature is, smaller the difference is.

The suction temperature can be comparable with the air temperature, if it is lower by 5°C – the outdoor unit can be frozen, the fan is not running or something is stopping the air flow through the outdoor unit. Ideally the suction temperature is 1°C to 3°C warmer than the air temperature (refrigerant is slightly heated in the reverse valve).

Causes for A02, A06, A13:

- Frozen outdoor unit – connected with EEV's oscillating and lower suction temperature
- Refrigerant leakage – it is necessary to check the whole system – place of leakage can be oily
- Fan is not running
- Refrigerant's leakage to the plate exchanger, it is connected with growing pressure in the heating circuit (if the system has an expansion tank). This is a fatal problem, does not happen very often.

3.7 Fault A05 – high compressor suction temperature (evaporator's temperature)

- High suction temperature (at evaporator) during heating – the reverse valve does not switch, in the Optimal series the check valve can be broken through (bypass). The sensor can be broken.

3.8 Invalid defrost

- Check the parameter DF03 in regulation – High pressure temperature for the end of defrost
  - DF03 = 40°C for Acond PRO-R and Acond PRO-N
- Check the outdoor temperature sensor – it should not be affected by the evaporator's temperature
- The filtrdehydrator is clogged – not very often
- Check switching of the 4-way valve
  - 230 V on the electric coil
  - The temperature on the 1st and 3rd pipe on the 4-way valve must change after heating/defrost switch
  - During the switching of the 4-way valve the high pressure and the low pressure must be equal – it can be noisy
- Check the volume of the refrigerant

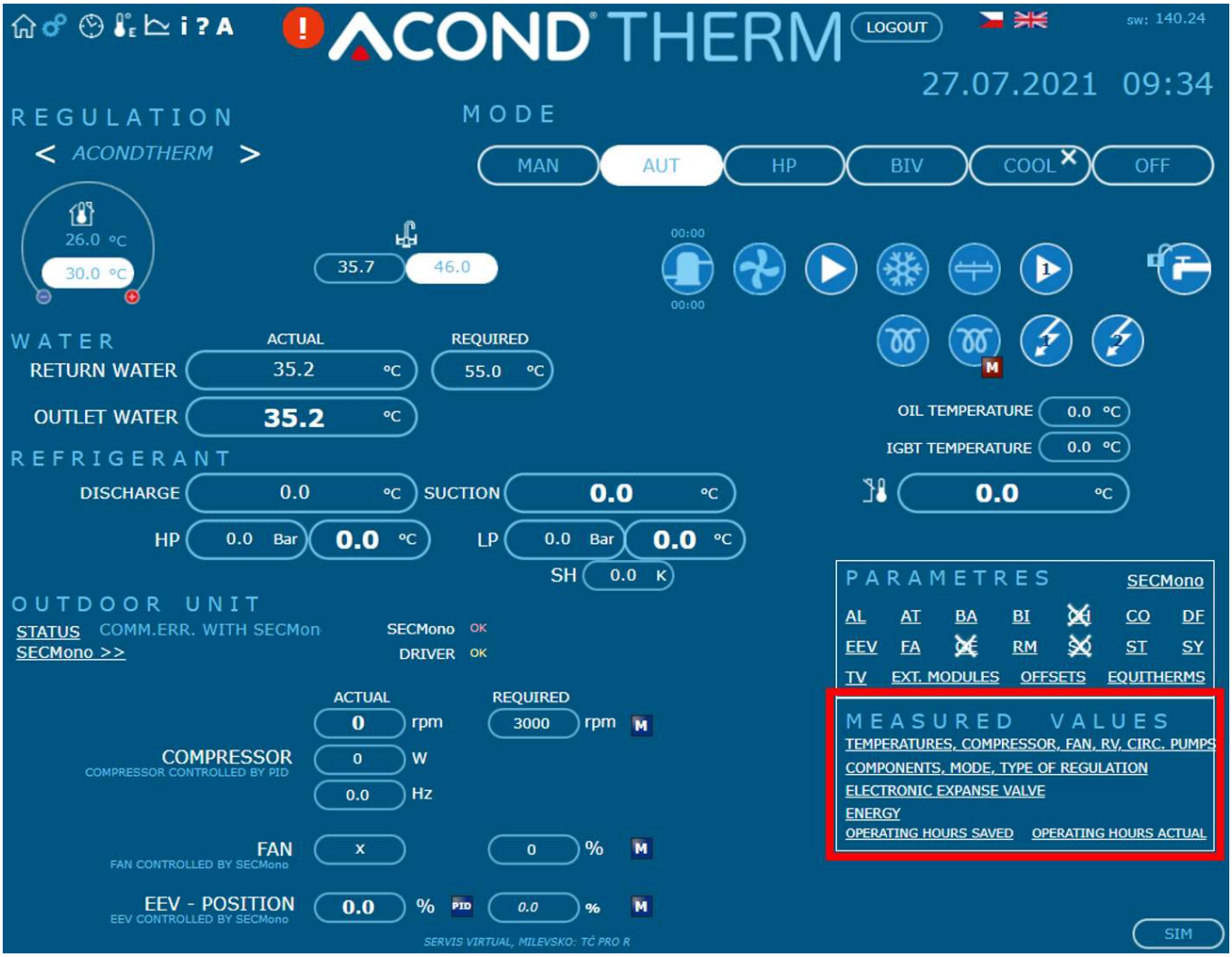
3.9 Fault A03 – compressor is not running

- Check the driver's errors (mainly in history – file Electronic expansion valve)

4. The work with the saved data

4.1 Location of the history collecting files

In the web interface you find the history collecting files in the Measured values table, see following image. Then you proceed to the choosing of the year, month and a day. The file is stored in Saved files folder.



4.2 File Electronic expansion valve

The errors related to the inverter can be easily recognized in the file Electronic expansion valve:

- **Column SH** means superheat (SH). The superheat is the difference between the suction temperature and evaporating temperature. If the superheat while the compressor is running oscillates for about +-1K and more, the heat pump is probably frozen.

- **Column EEV** – The EEV‘s opening. While the compressor is running the value should not oscillate too much. During defrost the expansion valve is fully open (500 steps). If the compressor is running and the heat pump is heating and the EEV is open more than 400 steps there is a probability of a leakage.
- **Column comp_rpm_act** – compressor’s frequency in rounds/min
- **Column ErrSECMono, ErrDriver** – only for heat pumps Acond PRO, error announced by motherboard SECMono or by the driver
- **Column VT_stupně**, ev. **HP_grad** – high pressure value (condensation temperature) in °C. The value is being compared with value **T02** (HP outlet temperature), if the difference is greater than 5°C to 7°C, there is a probably an issue with the refrigerant (refrigerant refill is needed). If the HP is frozen and the SH is oscillating and the EEV is ajar the HP_grad can be for a short time considerably greater than T02. The issue with the refrigerant is relevant only if the HP_grad is a for long term greater than T02.
- **Column NT_stupně**, ev. **LP_grad** – the value of low pressure (evaporating temperature) in °C. The value is being compared with value T04 (outdoor temperature). If the LP is greater for about 15°C and more than T04 for a long time it may mean refrigerant’s leakage (if the EEV does not oscillate) or the HP can be frozen (the EEV would oscillate).
- **Column T13** – refrigerant’s temperature at compressor’s displacement. If the temperature is greater than 120°C, something is incorrect. The compressor overheats (is not sufficiently lubed, insufficient refrigerant’s volume) but it is not common.
- **Column komp** – The compressor is/isn’t allowed to run.
- **Column fan** – The fan’s rounds/min.

4.3 File Temperatures

From this file you can mainly find problems with insufficiently heated room, accumulation tank, domestic hot water.

5. HP PRO – alarms, sensors' errors, warnings

P99 – blocked, the time for entering of the payment code has expired. The electric rod is set on.

5.1 Alarms

A08 – slow domestic hot water heating – stops the DHW heating, occurs just once and stays shown

5.1.1 Alarms stopping the HP from operation and switching on the electric bivalent rod:

A01 – refrigerant's high pressure, outdoor unit's overheat – check the water flow, filters and circulation pump

A02 – refrigerant's low pressure – wrongly set defrost, outdoor temperature is too low for operation

A03 – compressor's operation

A04 – low temperature of the ground collector – check the brine's pressure, check the circulation pump

A05 – high compressor's suction temperature – the temperature exceed the parameter AL13

A06 – low compressor's suction temperature – the temperature dropped below the parameter AL11

A07 – antifreeze protection, low temperature in plate exchanger, electric rod starts. During the OFF mode the circulation pump starts.

A09 – high compressor's displacement temperature

A10 – fan's operation

A11 – issue with the communication with the SECMono regulator

A12 – too long defrost

A13 – too many defrosts

A15 – high temperature of the IGBT components – tighten up the driver to the plate exchanger

A18 – low suction temperature during the defrost, it stops the defrost

SH01 – low superheat

SW, HW alarms – the alarm code address is in the bracket

SW1 – software alarms SECMono [295] – software alarm send by SECMono,

SW2 – software alarms SECMono [296] – software alarm send by SECMono,

HW1 – hardware alarms SECMono [297] – hardware alarm send by SECMono,

HW2 – hardware alarms SECMono [298] – hardware alarm send by SECMono,

DR1 – driver alarms SECMono [322] – alarm send by the driver of SECMono

DR2 – driver alarms SECMono [323] – alarm send by the driver of SECMono

DR3 – driver alarms SECMono [364] – alarm send by the driver of SECMono

DR4 – driver alarms SECMono [365] – alarm send by the driver of SECMono

5.1.2 Alarms stopping the HP and the electric bivalent rod from operation

A14 – blocked sensors

A16 – low flow through the plate exchanger – clogged water filter, aired water circuit, fault circulation pump

A17 – low flow through the brine plate exchanger – aired brine circuit, insufficient circulation pump performance, fault circulation pump

5.2 Sensors' errors

Errors that do not wait for the acknowledgment, they disappear after 10s (the fault is no longer relevant).

5.2.1 Sensors stopping the HP and the electric bivalent rod from operation:

P02 – the sensor on the outlet from the plate exchanger

5.2.2 Sensors topping the HP from operation and switching on the electric bivalent rod:

P01 – water reverse from the heating system temperature sensor

P03 – compressor's suction temperature sensor

P04 – outdoor temperature sensor

P13 – compressor's displacement temperature sensor

P15 – low pressure sensor

P16 – high pressure sensor

5.2.3 Sensors sending the information about an error:

P05 – room thermostat

P06 – domestic hot water temperature sensor

P08 – solar temperature sensor

P09 – room thermostat - 2nd circuit

P10 – pool temperature sensor

P11 – water temperature sensor placed after mixing valve for floor heating system

P12 – brine temperature sensor

5.3 Warnings

Warnings that do not wait for the acknowledgment, they disappear.

W00 – high HP outlet temperature – stopping the HP and bivalent electric rod, activates heating system circulation pumps. If the domestic hot water in the boiler is cold, the domestic hot water is heated.

W01 – low room temperature

W02 – low HP inlet temperature – the circulation pump is not running, the DHW is not heated, the bivalent electric rod is activated sooner

W03 – high temperature of the IGBT components, it lowers the rounds per minute to value IV15

W04 – high temperature in accumulation tank – stopping the HP and bivalent electric rod, activates the heating system circulation pumps. The DHW is heated if it is cold.

W05 – low evaporator's temperature, activates the defrost

W07 – low plate exchanger's temperature – it stops the defrost, the heating of the DHW and heating water. It starts the HP.

W09 – the IP address has not been assigned

W11 – the antisepsis is too long, it stops it

5.4 SECMono errors (file EEV, column ErrSecMono)

1 – A LP (low pressure)

2 – A SH low – low superheat

3 – A SH hi – high superheat

4 – n/a

5 – W_SH_EVI_hi – probably n/a

6 – W refrigerant leakage, the EEV is way too open

7 – A HP (high pressure)

8 – W envelope – low condensation temperature (TC low)

9 – W envelope – high condensation temperature (TC hi)

10 – W envelope – low evaporating temperature (TE low)

11 – W envelope – high evaporating temperature (TE hi)

12 – Freeze

13 – Alarm envelope

14 – W too long defrost

15 – W MCU arithmetic error

16 – A compressor's displacement temperature it too high (DT hi)

17 – RV – small deltaP after switching 30s after start

18 – W high displacement (hi discharge zone)

19 – A EEV

20 – n/a

21 – n/a

22 – A P1 LP sensor

23 – A P2 HP sensor

24 – n/a

25 – A T4 – suction temperature sensor

26 – A T5 – reverse water temperature sensor

27 – A T6 – displacement temperature sensor

28 – A T7 – HP outlet water temperature sensor

29 – n/a

30 – W T2 – outdoor temperature sensor

31 – A T3 – čidlo tep. na výparníku (jen split, nemáme osazeno)

32 – n/a

33 – driver (VSS) communication

34 – n/a

35 – A high pressure switch

36 – driver (VSS) locked, 2 min power off need

37 – EEPROM failure

38 – comm. timeout s PLC

39 – A compressor alarm

40 – A driver configuration

41 – A SECMono configuration (set address. [1])

5.5 Driver's errors (A – alarm, W – warning) (file EEV column ErrDriver)

1 – A komp. – U current sensor

2 – A komp. – V current sensor

3 – A komp. – W current sensor

4 – A PFC current sensor

5 – A IPM temperature sensor

6 – A PFC temperature sensor

7 – A DT temperature sensor

8 – A lost communication

9 – A EEPROM

10 – A AC overcurrent

11 – A AC overvoltage

12 – A AC undervoltage

13 – A DC overvoltage

14 – A DC undervoltage

15 – A HP – highpressure

16 – A phase sequence

17 – A IPM overheat

18 – A IGBT overheat

19 – A compressor's code

20 – A compressor's overload (HW overcurrent)

21 – A phase U overload

22 – A phase V overload

23 – A phase W overload

24 – A compressor – phase lost

25 – A compressor – stator lost

26 – A compressor – run-up problem

27 – n/a

28 – A compressor's overload

29 – A compressor – high compressor's displacement temperature

30 – n/a

31 – A compressor – IPM desaturation protection

32 – A compressor – lost rotor 2

33 – A compressor – lost rotor 3

34 – A PFC HW overload (overcurrent)

35 – A PFC SW overload (overcurrent)

36 – A PFC overvoltage

37 – A AD AD fault

38 – A wrong addressing

39 – Lost communication with the driver