

User manual FIL-SPL remote accessory



Jäspi FIL-SPL Remote accessory is a factory installed accessory for FIL-SPL electrical boilers with EP15-30 control unit. The accessory makes possible to read status of the boiler, set boiler enable and to control the boiler with 0-10 V control message or via Modbus. The remote accessory supports both Modbus TCP and Modbus RTU.

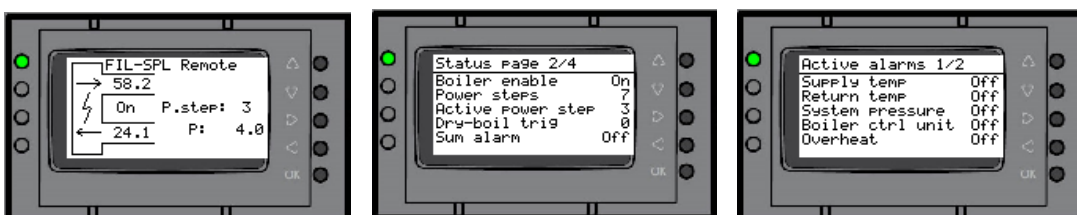
Jäspi FIL SPL Remote accessory increases safety with two new properties. The accessory has an integrated maximum value for heating medium supply temperature sensor, that shuts down the boiler by disabling boiler enable. Also the pressure of the system must stay within given range, otherwise the boiler enable will be disabled.

Following properties can be monitored via Jäspi FIL-SPL Remote accessory

- Heating medium supply/return temperatures
- System pressure (installer installs pressure sensor)
- Active power step (0-7 or 0-15)
- Status of boiler enable
- Active alarms (control unit, sensor values within range...)
- Operating hours (electricity on, any of power steps active, counter for each power relay)
- Temperature of electrical junction box
- Amount of dry-boiling preventer triggering
- Outdoor temperature (if extra sensor is installed)
- Active power and consumed power via external energy meter (optional accessory)

Following properties can be controlled via Jäspi FIL-SPL Remote accessory

- Boiler enable
- Clear of alarms (only certain alarms)
- Active power step or target temperature (if selected to be used).



Properties

The FIL-SPL remote accessory has integrated properties as described below. Note that in case of major issues, e.g. triggering of dry-boiling preventer or temperature limiter, the electricity of whole FIL-SPL boiler will be disabled. In this case also supply of remote accessory will be disabled.

Alarm relay

In case of any alarm, the alarm relay will be activated. The alarm relay is a change over switch up to 3 A 250 VAC resistive load.

Outdoor temperature

By default the outdoor temperature is disabled and not used. If needed, the outdoor temperature measuring can be activated from settings menu. Additionally installer must install external temperature sensor next to FIL-SPL outdoor sensor. Type of the outdoor temperature sensor is PT1000. The outdoor temperature can be read via Modbus. There are configurable minimum and maximum values, that determines in which range the outdoor temperature should stay. An alarm will be given if outdoor temperature is not in range.

Boiler temperatures

In the boiler, there are supply temperature sensor (to heating medium), return temperature sensor (from heating medium) and boiler electrical junction box temperature sensor. All three sensor values are readable via Modbus. Those temperatures are observed and an alarm will be given, if temperature is not in range. Each temperature has own configurable minimum and maximum values.

Overheat protection

The Jäspi FIL-SPL remote accessory observes supply temperature (to heating medium). In case of overheat, the boiler enable will be disabled and an alarm will be given. The limit value for overheat is 105 °.

Power step of the boiler

Currently used power step is readable via Modbus. The boiler may have either 0-7 or 0-15 power steps. Correct amount is configured in the factory.

System pressure

A pressure sensor is installed in supply pipe of the boiler. The pressure sensor observes pressure of the system and gives boiler enable if pressure is in configurable range. If pressure goes out of the range, boiler enable will be disabled and an alarm will be given.

Alarm of FIL-SPL control unit

In case of an alarm in FIL-SPL control unit, the alarm is forwarded to an alarm relay of FIL-SPL remote accessory and it is readable via Modbus.

Triggering amount of dry-boiling preventer

Some of the FIL-SPL boilers are equipped with dry-boiling preventer. The dry-boiling preventer is a sensitive safety device, of which detects relatively small air bubbles in the system. After detecting air in the system, the electricity of the FIL-SPL boiler will be disabled. Before that, the FIL-SPL remote accessory detects the triggering of dry-boiling preventer, stores it to a non-volatile memory and increases triggering amount with one.

Boiler enable

Status of the boiler enable can be read from the register (note that if external 230 V boiler enable of FIL-SPL boiler is used, it is not detected nor indicated with FIL-SPL remote accessory). In automatic mode, the boiler enable is given when system pressure is within range and supply temperature is lower than overheat temperature.

In manual mode the boiler enable can be disabled (force), but cannot be forced to enable, if system pressure is out of range or supply line temperature is equal or bigger to overheat temperature.

Register for alarms

The alarm relay is activated by sum alarm. In addition, FIL-SPL remote accessory has integrated register for alarms. From this register it is possible to detect which alarm has triggered the sum alarm. Some of the alarms can and must be cleared and some of them will be cleared automatically after measured values have returned back to range.

Operating hours counter

In FIL-SPL remote accessory, there are six counters for operating hours. Total counter counts how many hours electricity has been on for FIL-SPL boiler. Power step counter counts how many hours any of power steps has been enabled. Additionally, there are four counters for power levels, one for each in 0-15 steps boiler. Operating hours power levels indicates how many hours current power level relay has been enabled.

Controlling boiler temperature

The FIL-SPL boiler control unit has possibility to be controlled via 0-10 V control voltage. The FIL-SPL remote accessory can be configured to control the FIL-SPL boiler. Possible modes are:

- to control power step. i.e. determine which power step is to be used via Modbus
- to control target temperature i.e. determine which supply line temperature is wanted
- to drive through 0-10 V input voltage of FIL-SPL remote accessory to input of FIL-SPL boiler

Note that when taking this property in to use, FIL-SPL control unit must also be configured accordingly (0-10 V external control voltage settings).

Boiler power step information as 0-10 V output

Power step information is given out also via 0-10 V information. Incoming information from FIL-SPL boiler is forwarded straight to 0-10 V output of FIL-SPL remote accessory.

Energy meter accessory

As an optional accessory it is possible to measure power consumption of FIL-SPL boiler with external energy meter. Total active power and consumed total power are read from the register via Modbus RTU and given to Modbus register of FIL-SPL remote accessory.

Menu

Start

[right]	Status 1 (temperatures)
[right]	Status 2 (operation)
[right]	Status 3 (operating hours)
[right]	Status 4 (energy meter)
[left]	Alarms 1
[right]	Alarms 2
[long left]	Settings 1 (temp limits)
[right]	Settings 2 (temp limits, outdoor sensor)
[right]	Settings 3 (pressure, boiler en)
[right]	Settings 4 (control voltage)
[right]	Settings TCP
[right]	Settings RTU
[right]	Settings time

Menu is operating with the same principle on each alarm, status and settings pages. Pressing right arrow enters next page (if available). Pressing left arrow closes page and returns to previous page. If page has configurable values, those can be selected with up and down arrows. Modification happens by selecting value, pressing ok-button, then entering new value with arrows (up, down, left, right) and accepting modification by pressing ok-button. If the variable has high or low limit, user interface does not allow to set illegal value.

From start screen, it is possible to move to

- Alarms menu by pressing left arrow
- Status menu by pressing right arrow
- Settings menu by keeping left arrow pressed for few seconds.

Start screen

Menu of the Jäspi FIL-SPL remote accessory is as shown above. The start screen (below) indicates most important values. On the start screen is shown:

1. Heating medium supply temperature
2. Boiler enable
3. Active power step
4. System pressure
5. Alarm, if any of alarms is active (in example figure, heating medium supply temperature is out of range)
6. Heating medium return temperature

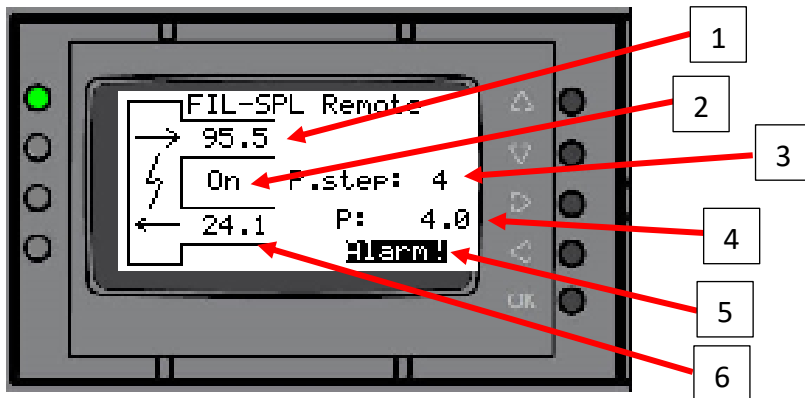


Fig. 1. Start screen.

Temperature values are shown as °C. Pressure is as bar and energy as kWh.

Alarms menu

Alarms menu is accessed by pressing left arrow from start screen. Alarm 2 page is accessed by pressing right arrow on alarm 1 page. Both, dry-boiling alarm and overheat alarm can be cleared from the menu. Other alarms cannot be cleared, because those will be cleared automatically after values return back to range.

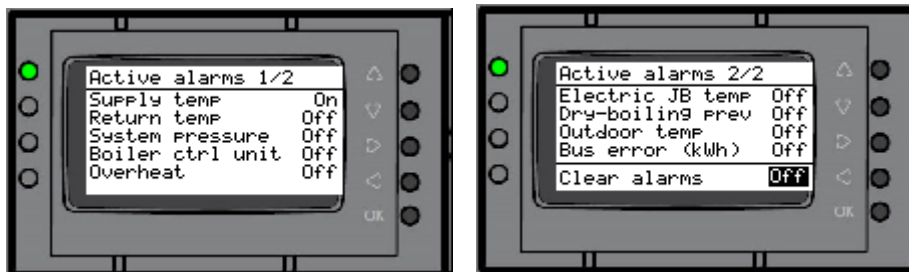
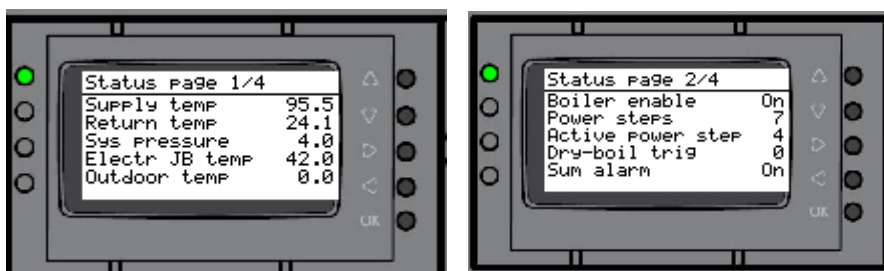


Fig. 2. Alarms menu 1 and 2.

Status menu

Status menu is accessed by pressing right arrow from start screen. From status menu, it is possible to see following measurements. Status pages are only for indicating status, there are no configurable variables



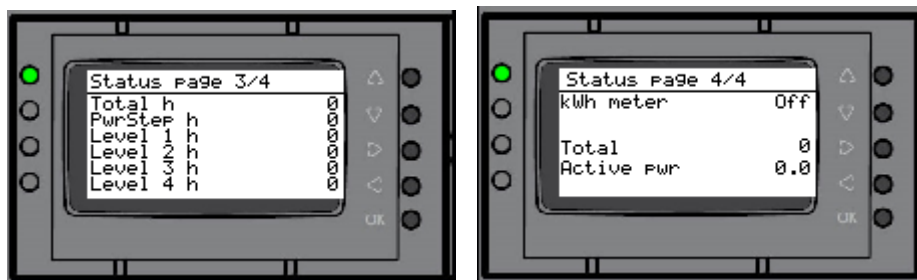


Fig. 3. Status menu 1, 2, 3 and 4.

Settings menu

Settings menu is accessed by keeping left arrow pressed for few seconds on start screen. From settings menu, all configurable values are in settings pages.

Note that version number of the software is shown on settings page 1 (top right).

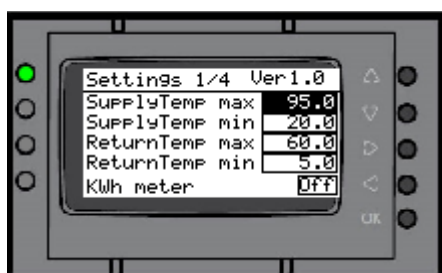


Fig. 4 Settings 1, temperatures

Supply temperature to heating medium has configurable minimum and maximum values. Also return temperature of heating medium has own configurable range. An alarm will be given if either temperature is out of configured range.

If an external kWh-meter is installed for boiler, the kWh meter should be enabled. Only supported model is Schneider iem3250.

Variable	Min	Default	Max
Supply temp max	10,0	95,0	105,0
Supply temp min	0,0	20,0	99,0
Return temp max	10,0	60,0	99,0
Return temp min	0,0	5,0	99,0
kWh meter	Off	Off	On

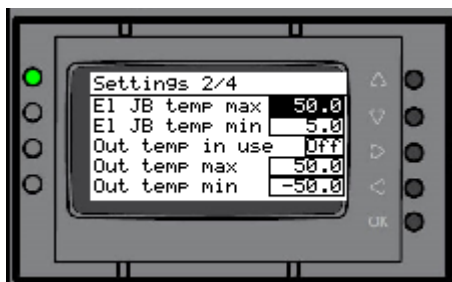


Fig. 5. Settings 2 temperature and outdoor temperature

Electrical junction box temperature has configurable minimum and maximum values. Also outdoor temperature has own configurable range. An alarm will be given if either temperature is out of configured range. Note that outdoor temperature is not observed, if outdoor temp in use is disabled.

Variable	Min	Default	Max
Electrical JB temp max	0,0	50,0	60,0
Electrical JB temp min	0,0	5,0	40,0
Outdoor temp use	Off	Off	On
Outdoor temp max	0,0	50,0	75,0
Outdoor temp min	-75,0	-50,0	50,0



Fig. 6. Settings 3, pressure and boiler enable.

System pressure has configurable minimum and maximum values. An alarm will be given if pressure is out of configured range.

Boiler enable manual control is configured from this menu. The boiler enable operates automatically, when "Boiler en manual" is disabled. When the "Boiler en manual" is enabled, the boiler enable can be forced to disable with "Boiler en/disable". The boiler enable cannot be forced to enable, if either pressure is out of range or if supply temperature is higher than overheat temperature.

Overheat temperature is a read only value and cannot be modified.

Variable	Min	Default	Max
System pressure max	0,2	4,0	10,0
System pressure min	0,1	0,5	10,0
Boiler en manual	Off	Off	On

Boiler en/disable	Off	Off	On
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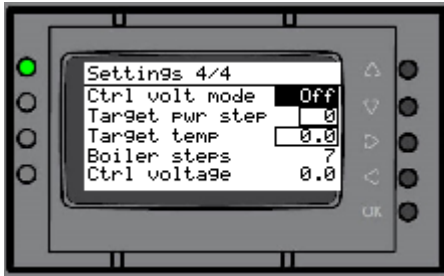


Fig. 7. Settings 4 boiler control.

Boiler control menu selects if control voltage is to be used. Control voltage mode selects which mode the output voltage (0-10 V) for boiler is given. Possible selections are:

- Off (not used)
- Step (target power step is given)
- Temp (target temperature is given)
- Input (0-10 V input is given directly to boiler).

Boiler steps is an indication of currently used power step in boiler (0-10 V feedback). Boiler steps indicates how many possible power steps the boiler has (0-7 or 0-15). Control voltage indicates currently driven output control voltage (0-10 V) to boiler.

Note that the control unit of the boiler must be configured accordingly, if control voltage is to be used.

Variable	Min	Default	Max
Control voltage mode	Off	Off	Step, Temp, Input
Target power step	0	0	7 or 15
Target temperature	0	0	99,0

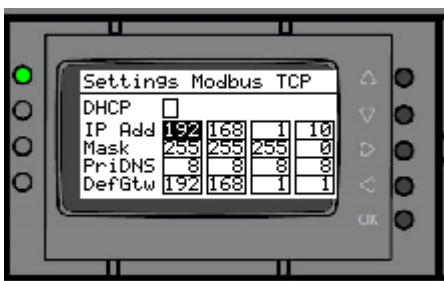


Fig. 8. Settings for Modbus TCP.

Modbus TCP settings are configured from this menu. Note that new setup will affect after reboot of the unit. These configurations affect only to Modbus TCP. The Modbus TCP port is 502.

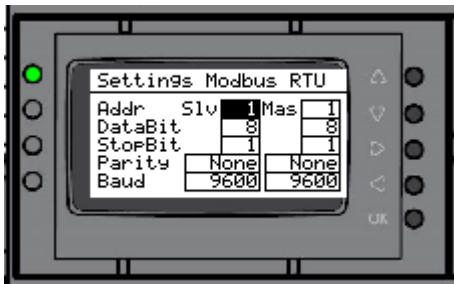


Fig. 9. Settings for Modbus RTU slave (left) and master (right, for energy meter).

Modbus RTU settings are configured here. On left is slave settings (unit operating as slave) and on right is master settings (unit operating as master for energy meter).

Modbus RTU supports following commands:

- Read input register 0x03
- Write multiple registers 0x10

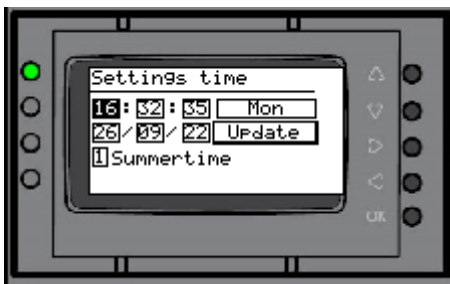


Fig. 10. Settings for time and date.

Time and date are configured in this menu. Note that configured values are saved after "Update" is activated. Summertime option can be selected to be used, if needed.

Register space

Jäspi FIL-SPL register list is available as separate excel table.

Input/output mapping

Label	Description	Meaning
AIL1	AIL1 analogue input	Outdoor temperature sensor
AIL2	AIL2 analogue input	Supply temperature sensor
AIL3	AIL3 analogue input	Return temperature sensor
AIL4	AIL4 analogue input	Boiler electrical junction box temperature sensor
AIL5	AIL5 analogue input	Boiler power steps in 0-10 V
AIL6	AIL6 analogue input	External control voltage in 0-10 V
AIL7	AIL7 analogue input	System pressure sensor
AIL8	AIL8 analogue input	Not used
DIL1	DIL1 digital input	Boiler control unit alarm
DIL2	DIL2 digital input	Dry-boiling preventer triggering
DOL1	DOL1 digital output	Boiler enable
DOL2	DOL2 digital output	Not used
DOL3	DOL3 digital output	Sum alarm
DOL4	DOL4 digital output	Not used
DOL5	DOL5 digital output	Not used
DOL6	DOL6 digital output	Not used
AOL1	AOL1 analogue output	Boiler control voltage out 0-10 V
AOL2	AOL2 analogue output	Boiler power step info out 0-10 V