



# Regula**Master** HTML

Pascal System controller

Regula Master HTML



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# Pascal



## Description

Regula Master HTML is a small and compact preprogrammed controller with internal display.

The display is backlit and the menus are easy accessible and controlled by pushbuttons on the front together with two LED indicators for alarm and write indication.

The software in Regula Master HTML is specially designed for the Pascal system, and contains three different set up configurations in the same standard unit: Single Regula Master (SRM), Local Regula Master (LRM) and Global Regula Master (GRM).

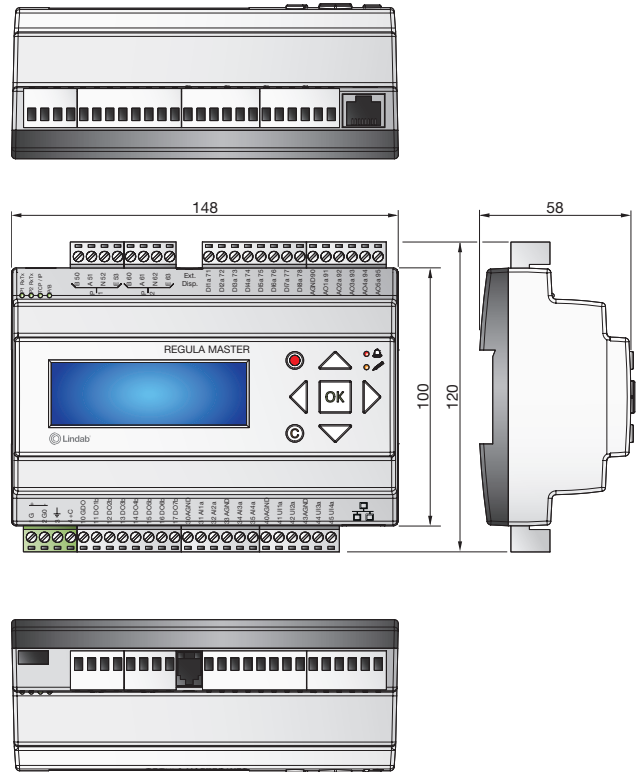
The controller has RS485 ports for internal Pascal EXOline communication to RC/EUC/FTMU, and a TCP/IP port for communication to BMS system. (EXOline TCP, Modbus TCP and Bacnet TCP).

Connecting to the TCP/IP port enables access to the Pascal. HTML5 based web server (Pascal Operate), with easy overview of the Regula Master HTML.

## Maintenance

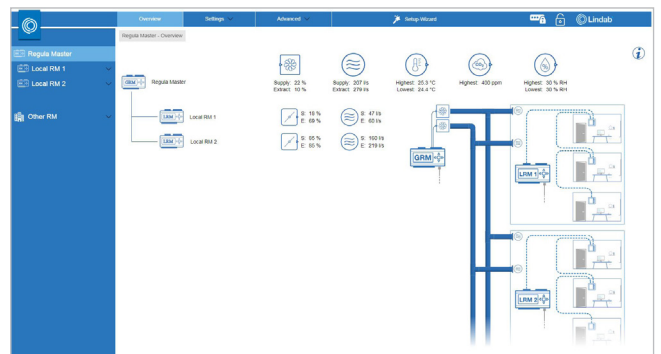
The visible parts of the device can be wiped with a damp cloth.

## Dimensions



## Pascal Operate Web server

Connecting to TCP/IP port enables access to Pascal Operate and easy overview of the Regula Master.



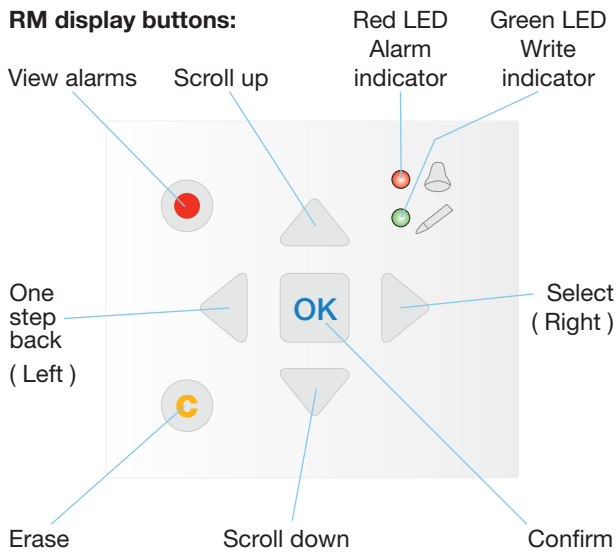
For more information see Pascal Operate tool on [www.lindQST.com](http://www.lindQST.com)

## Order code

<b>Product Type</b>	<b>Regula Master HTML</b>
Regula Master HTML	

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## Extract Control

Regula Master HTML has a built in Extract Control function. The procedure of the function is rather simple.

Created ( defined ) Supply RCs are connected to a created ( defined ) Extract RC.

The function adds together the airflow from the SRCs connected to the same ERC, and sends the request of total summed airflow to the Extract RC which controls the Extract volume flow damper.

There is also an option to add a Constant Flow, ( positive or negative ), to the sum of total airflow, as well as a Flow Factor can be applied on the sum of total airflow in case where more ( or less ) extract is needed. ( Flow factor = Extract/Supply, default 1.00 ).

## Optimizer function

Fan Optimizing function is performed by GRM or SRM, and runs automatically as soon as the system is defined in Regula Master WEB/s.

Damper position is read from all Regula Combi that have flow optimization activated. (active as default) via Exoline by LRM and further by GRM.

The Fan Optimizing function compares damper positions and regulates the fan output so the value of the damper that is most open at the actual moment is equal to the setpoint value, which can be defined ( default value 85% ).

The function is ideally varying the fan pressure between a min. and max. setting in AHU. Do not flow regulate the fans.

Fan Optimizing function is one of the features that contributes mostly when it comes to energy savings in HVAC systems.

( Regulation parameters, p-band and I-time are set per default, but can be changed if it is necessary. Note, this can cause system to become instable. ).

## Pressure limiter

An optional safety function in GRM / SRM to prevent that the system pressure exceeds 200 Pa ( adjustable ) in the supply and extract ducts. Use pressure limiter in AHU. Global RM connected as extern pressure regulator. with 0V = 0Pa, and 10V = AHU max limit.

The pressure control and the analog inputs AI3 and AI4 are activated in the Advanced menu with Pascal Operate:

System -> Pressure control -> SAF and EAF

Typically used when the AHU has extra capacity and a pressure limitation function is not included in the AHU controller.

## Operating Control

Regula Master HTML has operational control, which is performed when the unit is configured as either LRM or SRM.

- Regula Master HTML is monitoring SRC damper behavior in the system.
- Indicates alarm if a SRC/ERC damper does not move over time.
- Indicates alarm if communication with Regula Combi is lost.
- Indicates alarm if a presence sensor has changed over time.

## Night Cooling

Night Cooling function is a way of cooling down the building with cold outdoor air in night time, to save energy for cooling during day time.

It is the AHU controller or BMS system that activates and controls the Night Cooling function in the Pascal system.

The GRM/SRM must receive a digital signal, ( at DI2 ), from AHU controller or BMS to activate the Night Cooling function and then GRM/SRM will change mode in all SRC to *Unoccupied* and the cooling setpoint at *Unoccupied* in all SRC to 15°C ( adjustable ).

This is done to make sure the supply dampers will open to *AirflowMax* initially, but subsequently to regulate the cooling in each room and to obtain the full optimizer function.

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## Outdoor air cooling

If the Air Handling Unit does not have a cooling battery there is risk that the AHU cannot deliver cold air in the supply ducts to the rooms in hot summer days when outdoor temperature is higher than indoor temperature. To prevent unnecessary overheating of rooms the Outdoor air cooling function can be activated.

In case the outdoor temperature is higher than the room temperature the LRM/SRM will automatically change the Basic cooling temperature setpoint, and thus making sure that all SRC regulates to *AirflowMinOcc*. This control is made once every hour ( at hour change ).

If a CO<sub>2</sub> sensor is connected to SRC and the CO<sub>2</sub> level is exceeded, then the airflow can still raise to *AirflowMaxOcc*.

The Outdoor air cooling function is performed by LRM/SRM, and a duct temperature sensor ( PT1000 in supply duct ) is connected to the LRM/SRM.

However in a system with GRM and two or more LRM it is possible to connect the duct temperature sensor to the GRM instead, using only one central sensor. The central duct temperature connected to GRM is then transmitted to all LRM.

When outdoor air cooling is used, all SRC connected to same LRM/SRM must have the same Basic cooling temperature setpoint ( default 22°C ).

## ACB free cooling optimizer (Active chilled beam free cooling optimizer)

This function uses the temperature before and after the AHU to choose if it's most energy efficient to use water or air as first regulation sequence. ACB free cooling is only active when there's no presence to avoid draft problems. All connected SRCs running program 8 will be affected when ACB free cooling is used.

When using ACB free cooling two PT1000 sensors should be connected, one to main supply air (Tmain supply) and one to AHU inlet (T AHU inlet) both sensors are then connected to GRM/SRM.

## Forced Extract Balancing (FEB)

Forced extract balancing is used if there's extra extract that should be compensated elsewhere, e.g. kitchen hoods, fume hoods. Ultra link is installed in the extra extract to measure flow. Corresponding flow is sent to ERC (up to 16) which decrease their amount of air to keep balance in the room.

The UL that should be connected to least numbers of ERC:s should have number 1. (UL1) the UL with most connected ERC:s should be the last one. Make sure to dimension and configure the system, so the connected ERCs can cover the airflow of the Forced extraction.

## Inspection mode

Function in SRM/LRM used to change mode in all SRC at once for inspection and control measuring in a chosen time period ( default 240 min ) or without time, then it will continue until it's deactivated. The SRC's will automatically change back to their individual original mode Inspection mode is done. The following modes can be used:

**V<sub>nom</sub>** - Airflow 7 m/s

**Bypass** - AirflowMax

**Occupied** - flows between *AirflowMinOcc* and *AirflowMaxOcc* depending on actual room temperature and Basic cooling setpoint ( default 22°C ) + setpoint offset

**Unoccupied** - *AirflowMinOcc*, as long as actual room temperature is between heating setpoint at unoccupied ( default 15°C ) and cooling setpoint at unoccupied ( default 30°C ).

**Standby** - flows between *AirflowStandby* and *AirflowMaxOcc*, depending on actual room temperature and Basic cooling setpoint in standby mode.

**Off** - closed damper ( leakage flow ).

## Override control

Override is done on GRM/SRM and activated via BMS or DI3. Regula combi (supply and extract) is set to V<sub>nom</sub>, bypass, occupied, stand by or off (closed damper) simultaneously on all connected LRMs.

When override mode is active it's possible to decide what output that should be sent to AHU in percentage.

All buttons on Regula combi will be blocked and an A-alarm is shown in all connected Regula masters.

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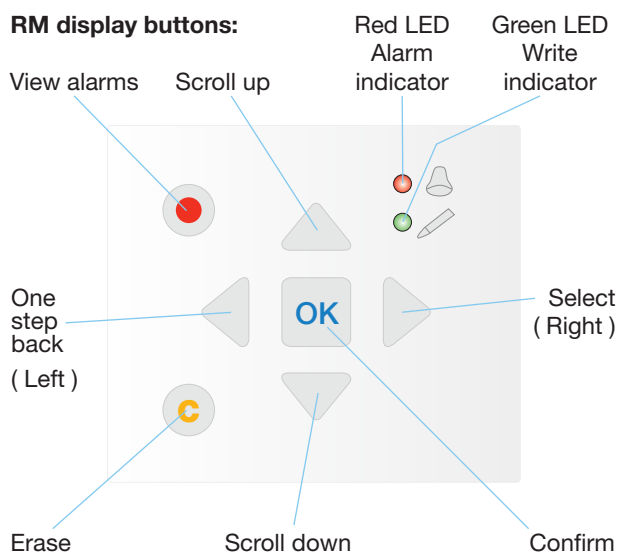
## Alarms and handling

In Regula Master there is a menu item called Alarm Events, where the alarms are listed.

If an alarm condition occurs the Alarm LED on the front panel will start flashing. The LED will continue to flash as long as there are unacknowledged alarms.

Alarms are logged in the alarm list. The list shows type of alarm, date and time for the alarm.

To access the alarm list, press the alarm button, the front panel button with the red button-top.



If there are multiple alarms, this is indicated by up / down arrow symbols at the right-hand edge of the display.

Use the UP and DOWN buttons to access the other alarms.

At the left end of the bottom display line the alarm status is shown. For active, unacknowledged alarms the space is blank. For alarms that have cancelled the text: "cancelled" is shown. Acknowledged, still active or blocked alarms are indicated by *Acknowledged* or *Blocked*.

Alarms are acknowledged by pressing the OK button. You are then given the choice of acknowledging the alarm or blocking the alarm.

Acknowledged alarms will remain on the alarm-list until the alarm input signal is cancelled.

Blocked alarms remain on the alarm list until the alarm is cancelled and the block has been removed.

New alarms of the same type will not be activated as long as the block remains.

Since blocking alarms can be potentially hazardous, you need a high log on authority to block alarms.

## Alarms in LRM/SRM

### "Inspection activated"

Alarm when inspection is active

### "SRC override"

Alarm when override SRC is active

### "ERC override"

Alarm when override ERC is active

### "Damper error SRC 1-26"

If the damper connected to the activated SRC haven't moved more than the set hysteresis ( in 2% ) within the set (23 time). Note! Is only alerting if the fan is running ( DI1 is connected to C+ or DI1 is activated via communication).

### "Damper error ERC 1-16"

If the damper connected to the activated SRC haven't moved more than the set hysteresis ( in 2% ) within the (23 time). Note! Is only alerting if the fan is running ( DI1 is connected to C+ or DI1 is activated via communication).

### "Presence sensor alarm SRC 1-26"

If the mode doesn't change from standby to occupied within the set time. (default 24h)

### "Comm. Error FTMU 1-8"

If there is no communication to the activated UL. (60 sec delay)

### "Comm. Error SRC 1-26"

If there is no communication to the activated SRC ( 60 sec delay ).

### "Comm. Error ERC/EUC 1-16"

If there is no communication to the activated ERC ( 60 sec delay ).

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## Alarms in GRM/SRM

### "Comm. Error LRM 1-8"

If there is no communication to the activated LRM ( 60 sec delay ).

### "SRC Comm Error LRM 1-8"

Summary alarm for all SRCs in the LRM ( no delay ).

### "ERC/EUC Comm Error LRM 1-8"

Summary alarm for all ERCs in the LRM ( no delay ).

### "SRC DamperError LRM 1-8"

Summary alarm for all the SRC dampers in the LRM ( no delay ).

### "SRC override"

Alarm when SRC override is active

### "ERC/EUC override"

Alarm when ERC override is active

### "SAF override"

Alarm when SAF override is active

### "EAF override"

Alarm when ERC override is active

## Controlling a LRM through GRM via push buttons

In larger systems with several LRMs and a GRM, there is possibility to control ( overtake ) different LRMs with the GRM which they are connected to.

This is practical for system maintenance as GRM can be used to set different parameters in LRMs ( connected to the actual GRM ) without need to physically stand next to a LRM. The GRM by use of Control function simply overtakes the chosen LRM.

### To use the Control function:

1. In GRM main menu choose Local Regula Master
2. Select the LRM which is to be controlled

To turn back to GRM, use "←" push button several times, until GRM menu appears.

## Global Regula Masters in cascade

In larger systems that would include more Global Regula Masters ( GRM ), it is desirable that the Fan Optimizing Function is including the whole system.

If a cascade system is need contact your local Lindab office for more information.



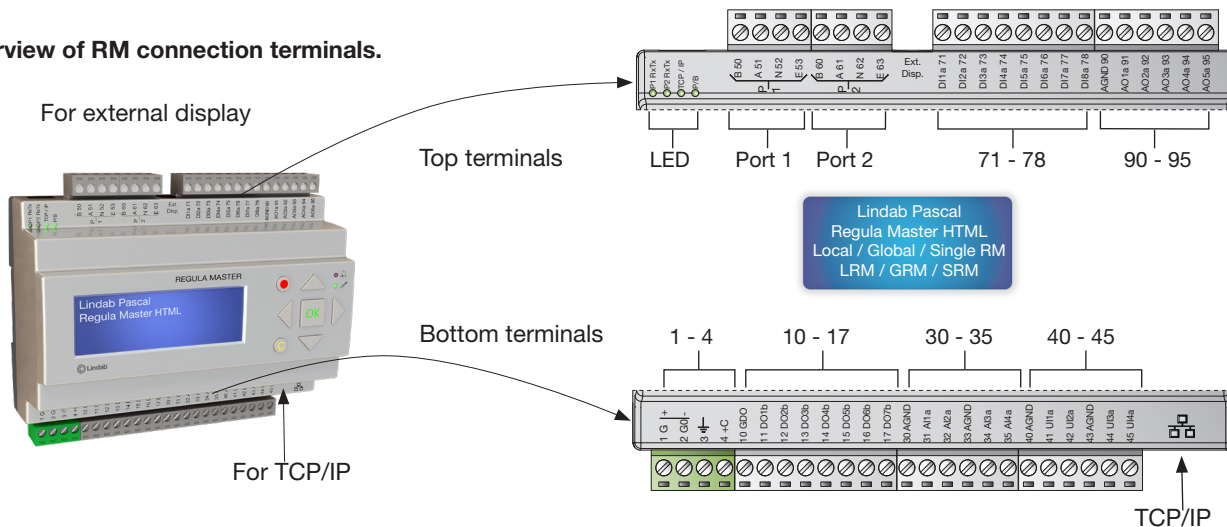


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## Terminals

### Overview of RM connection terminals.



Regula Master terminals overview		
	<p><b>1</b> 1 G Supply voltage 24 V AC</p> <p><b>2</b> G0 Supply voltage 0 V</p>	<p><b>3</b> Ground, internally connected to 2G0</p> <p><b>4</b> +C +24 V DC, reference for digital inputs DI</p>
	<p><b>10</b> GDO Reference for digital outputs DO, internally connected to 1G</p> <p><b>11</b> DO1b Summary Alarm</p>	<p><b>12</b> DO2b Not used</p> <p><b>13</b> DO3b Not used</p> <p><b>14</b> DO4b Not used</p> <p><b>15</b> DO5b Not used</p> <p><b>16</b> DO6b Not used</p> <p><b>17</b> DO7b Not used</p>
	<p><b>30</b> AGND Reference for analog inputs AI, internally connected to 2G0</p> <p><b>31</b> AI1a 2-10V cascade input supply damper pos.</p> <p><b>32</b> AI2a 2-10V cascade input extract damper pos.</p>	<p><b>33</b> AGND Reference for analog inputs AI, internally connected to 2G0</p> <p><b>34</b> AI3a Pressure sensor 0-10 V SAF</p> <p><b>35</b> AI4a Pressure sensor 0-10 V EAF</p>
	<p><b>40</b> AGND Reference for universal inputs UI, internally connected to 2G0</p> <p><b>43</b> AGND Reference for universal inputs UI, internally connected to 2G0</p>	<p><b>41</b> UI1a PT1000 Duct temperature sensor for AHU inlet. This is also used for ACB free cooling. (Tmain supply)</p> <p><b>42</b> UI2a PT1000 main duct supply temperature sensor. UI2 is used for ACB free colling. (TAHU inlet)</p> <p><b>44</b> UI3 Not used</p> <p><b>45</b> UI4 Not used</p>
	<p><b>TCP / IP</b> TCP/IP via RJ45 enable connection to Pascal web configuration tool and communication to BMS and other Regula Masters.</p>	
	<p><b>50</b> Port 1 B EXOline, to higher level units</p> <p><b>51</b> Port 1 A EXOline, to higher level units</p> <p><b>52</b> Port 1 N Connection shield</p> <p><b>53</b> Port 1 E Not used</p>	<p><b>60</b> Port 2 B EXOline, to lower level units</p> <p><b>61</b> Port 2 A EXOline, to lower level units</p> <p><b>62</b> Port 2 N Connection shield</p> <p><b>63</b> Port 2 E Not used</p>
	<p><b>71</b> DI1a Fan status. Signal from AHU controller. Reference 4 +C. Closed = on. Open = off.</p> <p><b>72</b> DI2a Night Cooling. Signal from AHU controller. Reference 4 +C. Default: Closed = Active. Open = Not active. NO / NC is selectable.</p>	<p><b>73</b> DI3a Override. Signal from AHU controller. Reference 4 +C. Default: Closed = Active. Open = Not active. NO / NC is selectable.</p> <p><b>74</b> DI4a Not used</p> <p><b>75</b> DI5a Not used</p> <p><b>76</b> DI6a Not used</p> <p><b>77</b> DI7a Not used</p> <p><b>78</b> DI8a Not used</p>
	<p><b>90</b> AGND Reference for analog outputs AO, internally connected to 2G0</p> <p><b>91</b> AO1a 0-10 V signal to freq. converter / ext. input on AHU controller for control of supply fan rpm</p> <p><b>92</b> AO2a 0-10 V signal to freq. converter / ext. input on AHU controller for control of extract fan rpm</p> <p><b>93</b> AO3a 2-10V cascade output supply damper position</p> <p><b>94</b> AO4a 2-10V cascade output extract damper position</p>	<p><b>95</b> AO5 Not used</p>



Most of us spend the majority of our time indoors. Indoor climate is crucial to how we feel, how productive we are and if we stay healthy.

We at Lindab have therefore made it our most important objective to contribute to an indoor climate that improves people's lives. We do this by developing energy-efficient ventilation solutions and durable building products. We also aim to contribute to a better climate for our planet by working in a way that is sustainable for both people and the environment.

[Lindab](#) | For a better climate