

# MIRU Control Function Guide, GOLD version E/MIRUVENT

## 1. General

The MIRU fan control system can control one type MIRU-VENT power roof ventilator.

Up to ten power roof ventilators with MIRU Control equipment can be connected to one GOLD air handling unit by means of bus communication (requires GOLD program version 1.09 or better).

This guide is meant for use as guidance in the electrical wiring and commissioning of MIRU Control equipment in combination with a MIRUVENT power roof ventilator. The function guide also deals with the electrical connections between MIRU Control and GOLD air handling units.

The fan motor in the MIRUVENT power roof ventilator should be a type AC motor with integrated frequency inverter, or EC motor with integrated motor control system that communicates with MIRU Control via Modbus.

## 2. Material Specification

### Control of MIRUVENT fan via MIRU Control:

MIRU Control equipment	<b>TBMZ-1-1</b>
MIRUVENT fan with type code	<b>MIRU-x-xx-xx-3-0</b>
	or <b>MIRU-x-xx-xx-1-x</b>

*x = model and size codes*

Pressure sensor, pressure regulation	<b>TBLZ-1-23-aa*</b>
Pressure sensor, flow measurement	<b>TBLZ-1-23-aa*</b>

*aa = code for cable length in metres.*

The cable from the pressure sensors must be long enough to reach the MIRU Control equipment.

Outdoor temperature sensor	<b>TBLZ-1-25-2**</b>
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### Wiring to the GOLD unit:

Connection kit:	<b>TBLZ-1-64</b>
Contains cable adapter and communication cable.	

Miscellaneous:

3-wire cable for communication to the MIRUVENT fan:

2-wire cable for possible outdoor temperature sensor.

Cable for supply voltage to MIRU Control, 230 V.

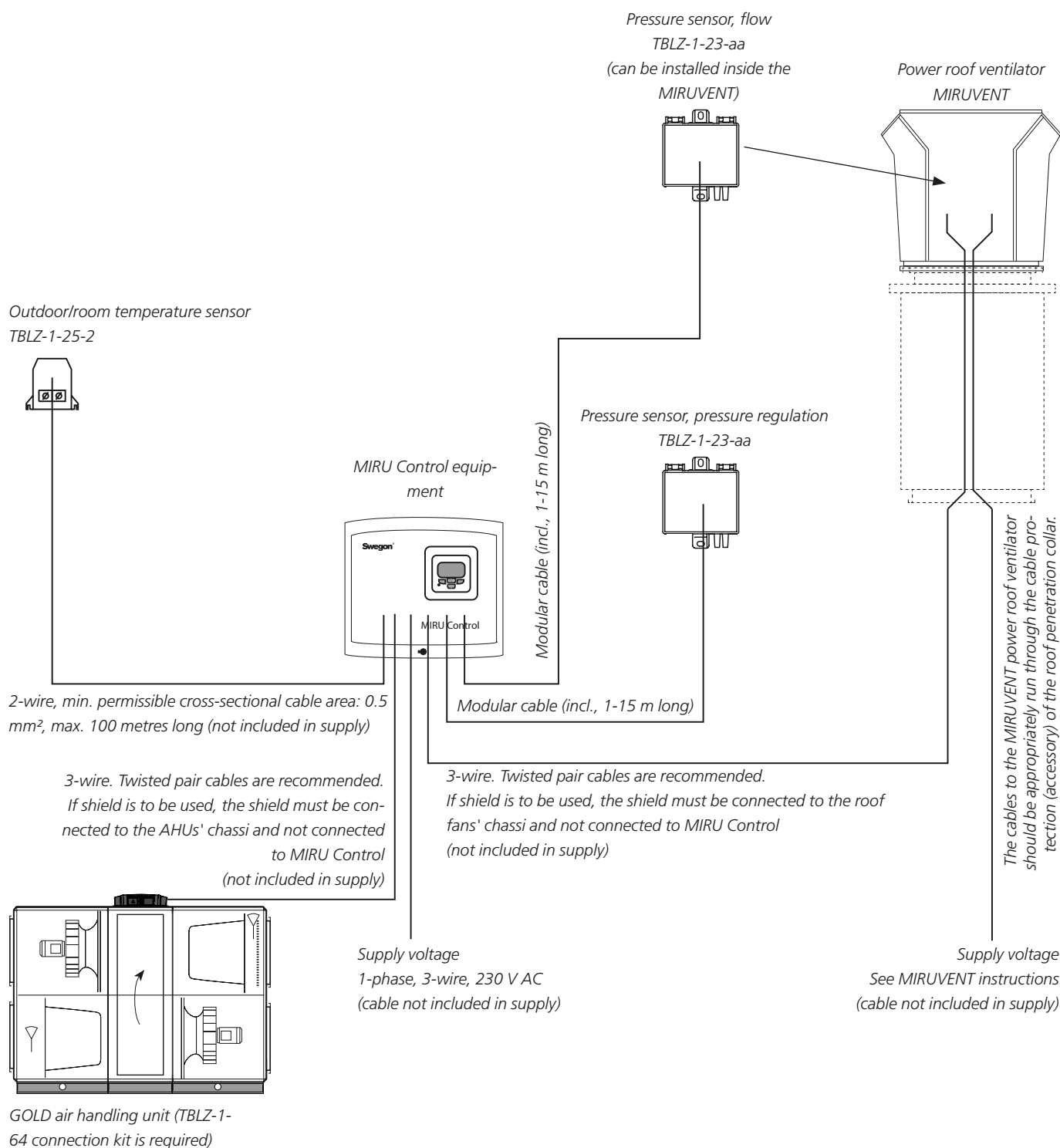
Cable for supply voltage to the MIRUVENT fan.

1 x 230 V or 3 x 400 V, see separate installation instructions for the MIRUVENT.

*\* At least one pressure sensor for either pressure regulation or flow measurement is mandatory. Two pressure sensors are possible, one for pressure regulation and one for reading the flow.*

*\*\* For outdoor temperature compensation only*

## 3. Basic Installation Diagram



## 4. Communication

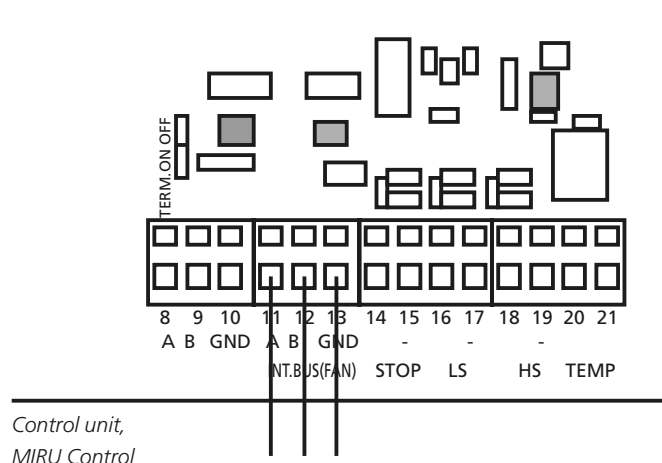
Physically install the GOLD air handling unit, MIRUVENT power roof ventilator and the MIRU Control equipment. See separate installation instructions.

### 4.1. MIRU Control and MIRUVENT power roof ventilator

#### Wiring the connections to MIRU Control

Connect the 3-wire cable to terminals 11 (A), 12 (B) and 13 (GND) on the control circuit card inside the MIRU Control unit. See illustration.

A twisted-pair cable is recommended.



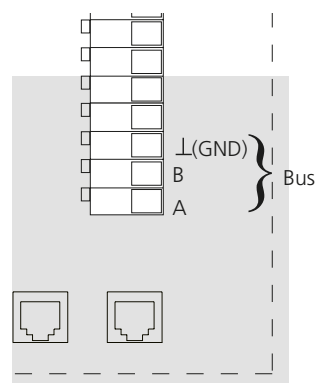
#### Wiring the connections to the MIRUVENT

##### MIRUVENT with AC motor and integrated frequency inverter

Unfasten and bend up the upper section of the frequency inverter.

Place the upper section in the groove designed to receive it in the lower section.

Connect the communication cable to terminals A, B and GND, next to the Bus marking. See illustration.

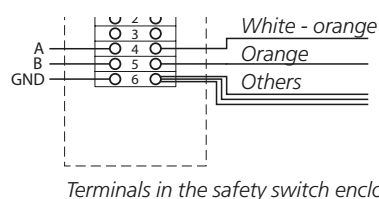


##### MIRUVENT with EC motor and control system

Connect the communication cable to the wiring terminals inside the safety switch enclosure.

Connect conductor A to terminal 4, conductor B to terminal 5 and GND to terminal 6.

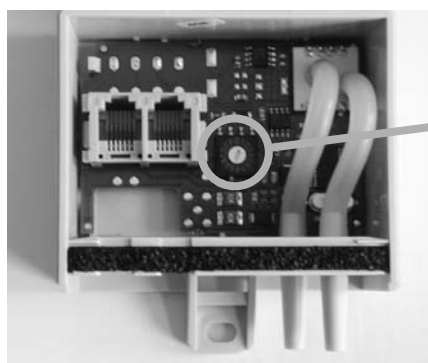
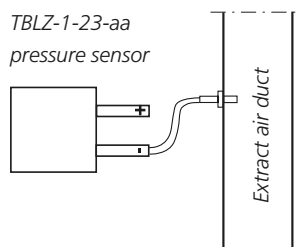
The internal electrical connections to the motor control have already been wired.



## 4.2. MIRU Control and TBLZ-1-23-aa pressure sensor

If **pressure regulation is used**, install the pressure sensor on or near the MIRUVENT fan's extract air duct. See illustration. Set the pressure sensor function selector switch to position 1. See illustration.

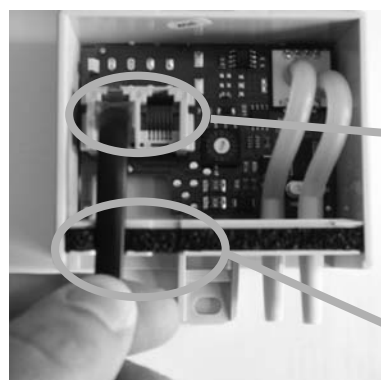
If **flow regulation is used**, the pressure sensor can be installed at a suitable location in the compartment for the fan motor inside the MIRUVENT fan. Connect tubes to the existing measurement tappings in the same space. Connect the tube from the blue tapping to pressure port (-) and connect the tube from the white tapping to pressure port (+) on the pressure sensor. Set the pressure sensor function selector switch to position 0. See illustration.



TBLZ-1-23-aa pressure sensor

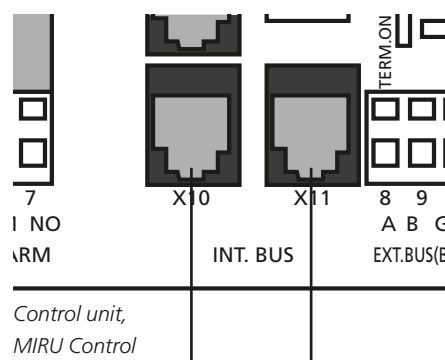
Connect the modular cable to an optional modular connection in the pressure sensor. See the illustration.

If the pressure sensor for pressure regulation *and* for flow measurement is used, they must be connected in series.



TBLZ-1-23-aa pressure sensor

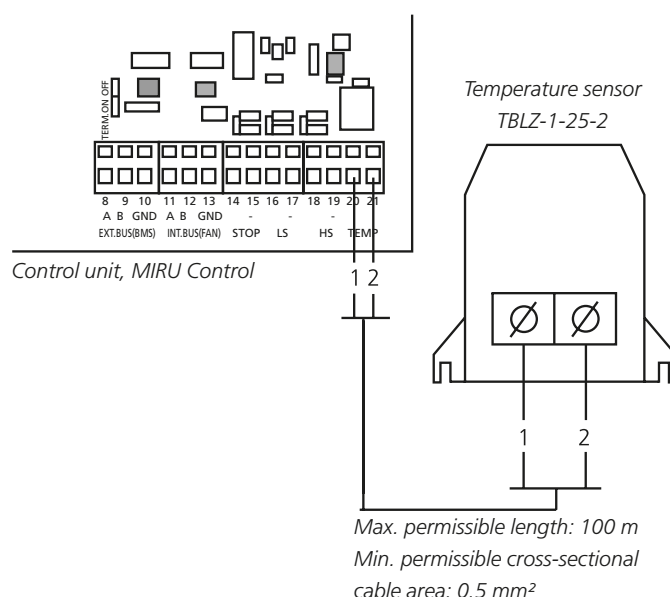
Connect modular cable(s) for the pressure sensor to MIRU Control in modular connection X10 and/or X11. See illustration.



### 4.3. MIRU Control and TBLZ-1-25-2 outdoor/room temperature sensor

Install the TBLZ-1-25-2 temperature sensor; see separate installation instructions.

Connect the cable having a min. permissible cross-sectional cable area of 0.5 mm<sup>2</sup> and a max. permissible length of 100 meter. See illustration.



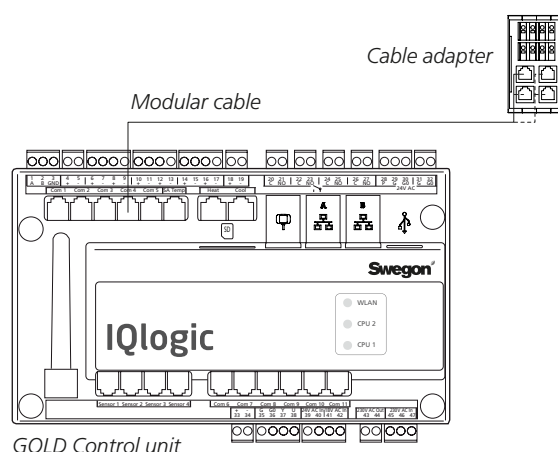
### 4.4. MIRU Control and GOLD air handling unit

This section is only of interest if you are wiring electrical connections to the GOLD air handling unit.

The TBLZ-1-64 connection kit accessory is required. The connection kit contains a cable adapter and a modular cable.

Install the cable adapter on the DIN rail inside the electrical cubicle of the GOLD unit or on another appropriate location near this cubicle.

Connect the modular cable between one of the modular connections on the cable adapter and the modular connection marked "COM4" on the control unit inside the GOLD unit. See illustration.



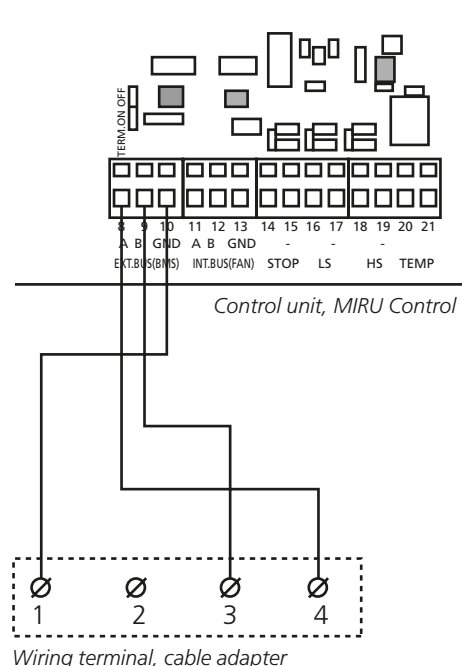
Connect the 3-wire cable between MIRU Control and the GOLD air handling unit.

A twisted-pair cable is recommended.

Connect the cable to terminals 8 (A), 9 (B) and 10 (GND) on the control circuit card inside the MIRU Control unit.

Connect conductor A to terminal 4 on the cable adapter, conductor B to terminal 3 and GND to terminal 1. See illustration.

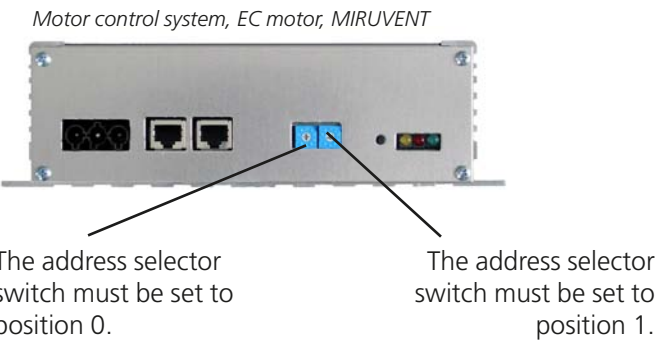
If more than one MIRU Control unit are to be wired to one GOLD unit, see Section 4.1 MIRU Control to GOLD in separate MIRU Control installation instructions.



5. Settings to be made prior to energizing

MIRUVENT power roof ventilator with EC motor and integrated control system

Check that the address selector switches are correctly set. See illustration.

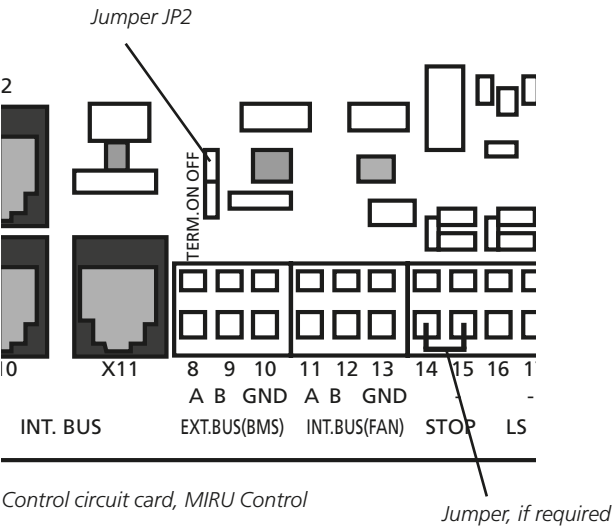


MIRU Control

If the External stop input is not used for controlling fan operation, a jumper must be connected between terminal 14 and terminal 15.

If a MIRU Control is connected to the GOLD unit, jumper JP2, "TERM. ON OFF", should be set to the ON position. See illustration.

If several MIRU Control units are connected to the same GOLD unit, the MIRU Control that is last in the communication loop should have its jumper JP2, "TERM. ON OFF", set to the ON position. Jumper JP2 of the other MIRU Control units should be set to the OFF position.



## 6. Settings, MIRU Control panel

When you energize MIRU Control, a number of settings must be made on the control panel.

For particulars on how to use the control panel, see the separate installation instructions for MIRU Control.

### Fan size

Set the size/type of MIRUVENT power roof ventilator, as the equipment MIRU Control is to control.

Read the fan size/type on the product identification plate of the power roof ventilator.

Set the corresponding size under Base setting. See menu.

Base setting		
Size	25-28-3-0	
Flow unit	m <sup>3</sup> /s	
Flow sensor	ON	
Press.reg.sensor	ON	
<Exit	↑↓	Edit>

Menu in the control panel, MIRU Control

### Flow unit

Set the required unit for flow measurement (m<sup>3</sup>/s , l/s or m<sup>3</sup>/h). Factory setting: m<sup>3</sup>/s.

### Fan regulation (control)

MIRU Control is factory preset for pressure regulation (Press. reg. sensor = ON). Pressure regulation requires connection of a pressure sensor set for pressure regulation (function selector switch setting = 1)

To select flow regulation, set the Flow sensor to ON and set Press. reg. sensor to OFF. Flow regulation requires connection of a pressure sensor set for flow regulation (function selector switch setting = 0)

If pressure regulation is in use, a flow reading can be obtained. This presupposes that two pressure sensors are connected and that both Press. reg. sensor setting and Flow sensor setting = ON.

The pressure is displayed in Pa and the flow according to the selected flow unit.

## 7. Base settings, MIRU Control connected to the GOLD unit

If one or several MIRU Control units are connected to one GOLD unit, a number of settings must be entered.

### One MIRU Control

If one MIRU Control is connected to the GOLD unit, the factory preset values apply.

Factory preset values:

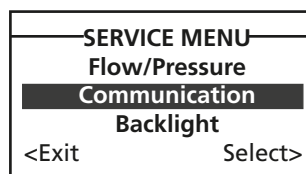
Modbus ID = 100

Speed = 38400

Parity = None

Stop bits = 1.

The settings can be checked under Service menu (code 1112) – Communication; see menu.



Menu in the control panel, MIRU Control

**2 - 10 MIRU Control units** Max. 10 units MIRU Control can be connected to one GOLD unit.

If two to ten MIRU Control units are connected to one GOLD unit, the Modbus ID for each MIRU Control must be unique.

The MIRU Control corresponding to Fan 1 in the GOLD unit's hand-held micro terminal, should have Modbus ID = 100. Fan 2 should have Modbus ID = 101. Fan 3 should have Modbus ID = 102, etc.

In the GOLD unit's hand-held micro terminal (under installation – Functions – MIRU Control – Functions OFF/ON), set Fan 1 = Active. If several MIRU Control units are connected, these fans should also be set = Active.



## 8. Operating mode settings

### MIRU Control

Line 2 in the start menu shows the fan's current operating mode, for example: STOP or LOW SPEED.

Line 3 in the start menu indicates, by showing various symbols, how the MIRUVENT power roof ventilator is controlled, for example via internal time switch or external supervisory system.

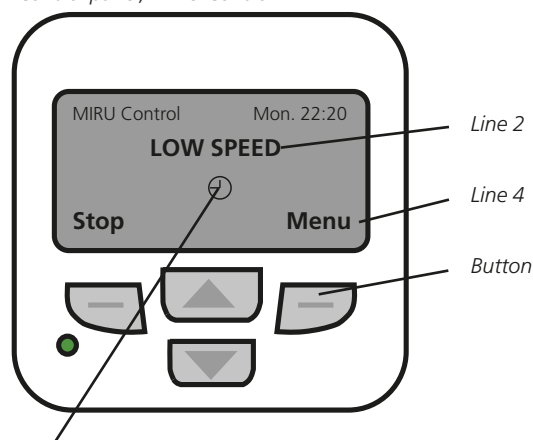
Line 4 in the start menu shows the current functions of the buttons, for example: Auto, Stop or Menu. "Auto" means that one press of the button sets the fan to the auto mode. "Stop" means that the fan is operating and that one press of the button sets the fan to the stop mode.

See illustration.

For further information about the control panel, see the separate installation instructions for the MIRU Control equipment.

**N.B.!** The stop input must be connected between terminal 14 and 15 in order to be able to start the fan.

Control panel, MIRU Control



Line 3

- Indicates that the MIRUVENT is controlled by any of the external inputs: stop, low speed or high speed.
- ⌚ Indicates that the MIRUVENT is controlled by the internal time switch to operate at low speed or high speed.
- ☐ Indicates that the MIRUVENT is controlled by an external supervisory system via an external BUS.

### Operating times via the Miru Control panel

Set the current date and time under Time/Date in the main menu.

Four different time channels can be set under Time channel.

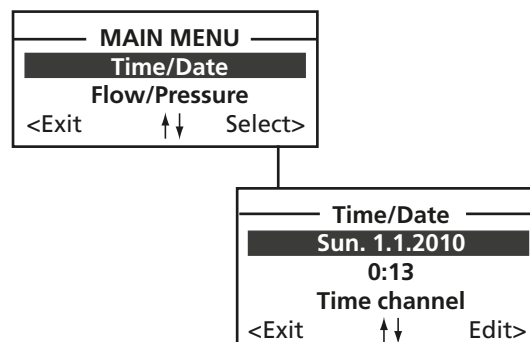
If the same in-operation times are to apply every day of the week (Mon.–Sun.), you need only program one time channel. Various in-operation times during the days of the week should be programmed in separate time channels (Mon.–Fri., Sat.–Sun. or Mon., Tues., Wed., etc.)

Set the low speed or high speed under Operation.

Set the start time (hh:mm) under Start time.

Set the stop time (hh:mm) under Stop time.

If the control equipment is in operation around the clock, we recommend using the digital inputs.



## Operating times via GOLD hand-held micro terminal

This section is only of interest if you are wiring electrical connections to the GOLD air handling unit.

In the GOLD unit's hand-held micro terminal (under installation – Functions – MIRU Control – **Operation level**) you must select the following for each fan (Fan number):

- Which flows or pressure the MIRUVENT fan should generate while operating in the low speed mode and high speed mode respectively: All the values can be set, but only those for the activated function (Flow regulation or Pressure regulation) will apply.

Under Miru Control – **Fan function**, you must select the following for each fan (Fan no.):

- Whether the MIRUVENT-fan is to have the same start and stop times as the GOLD unit. Select Parallel start.
- Whether the MIRUVENT-fan is to have the same low speed and high speed settings as the GOLD unit. Select Parallel low/high speed.
- Whether the MIRUVENT should operate together with the GOLD unit fans to automatically balance the flow.
- Which of the GOLD unit fans will operate to achieve total flow balance can be selected. If supply air is selected; the supply airflow in the GOLD unit will be increased by the corresponding rate. If extract air is selected, the extract airflow in the GOLD unit will be decreased by the corresponding rate.

Under Miru Control – **Schedule settings**, you can select the following for each fan (MIRU no.):

- Operation/Times for all four channels.  
Operation: Low speed or High speed.  
Time: If the same in-operation times are to apply every day of the week (Mon.–Sun.), you need only program one time channel. Various in-operation times during the days of the week should be programmed in separate time channels (Mon.–Fri., Sat.–Sun. or Mon., Tues., Wed., etc.)  
Inactive means that the settings for Operation and Time do not have any effect.



## 9. In-operation setting, Miruvent

### 9.1 AC motor with integrated frequency inverter, Modbus

Make sure that voltage is being supplied to the safety switch of the MIRUVENT fan.

Switch on the safety switch of the MIRUVENT fan.

The frequency inverter is now ready to receive control signals via communication from MIRU Control.

### 9.2 EC motor, Modbus

Make sure that voltage is being supplied to the safety switch of the MIRUVENT fan.

Switch on the safety switch of the MIRUVENT fan.

The red and green LED of the motor control system will flash during start up.

When the red LED stops flashing (only the green LED is flashing) the fan is ready to be started.

Check that the address selector switch, closest to the LEDs on the motor control system, are set to 0 resp. 1.

The motor control system is now ready to receive control signals via communication from MIRU Control.

## 10. Trouble shooting

### 10.1 AC motor with integrated frequency inverter, Modbus

Inside the frequency inverters, there are eight internal protections that initiate an alarm and stop the power roof ventilator.

The cause of the alarm can be read on LED 2 inside the frequency inverter. Remove the screws and bend up the upper section of the frequency inverter and read the number of flashes (followed by a longer unlit period).

1 flash	Low supply voltage
2 flashes	High supply voltage
3 flashes	Over current to motor
4 flashes	Over temperature in frequency inverter
5 flashes	Phase failure on supply voltage, phase lacking
6 flashes	Fluctuating supply voltage between phases
10 flashes	Communication failure between upper and lower sections
11 flashes	Memory circuit failure

These defects can be read in the menu on the MIRU Control panel, for example No. 1 Fan tripped.

#### To reset alarms.

Switch off the supply voltage to the AC motor and frequency inverter control system so long that the internal condensers become de-energised (approx. 90 seconds).

### 10.2 EC motor, Modbus

There are three defects that cause the motor control system to initiate an alarm and stop the power roof ventilator.

#### WRONG SPEED:

The LED on the motor control system alternately flashes red and green.

The fan speed is not in agreement with the setpoint for the fan motor.

One possible cause could be that a power monitor has registered max. limit motor output. The motor control system then decreases the fan motor's speed by 100 rpm causing the speed to deviate from setpoint.

Another possible cause could be that the wrong size has been preset under Base Setting in the MIRU Control.

#### UNDER VOLTAGE:

The LED on the motor control system shines red.

Low voltage in the intermediate level/rectifier.

#### MOTOR FAILURE:

The LED on the motor control system shines red.

Communication failure with Hall sensors (= position sensors).

#### To reset alarms.

Alarms can be reset in two ways:

1. By pressing the red reset button on the motor control system (to the side of the LEDs) and holding it pressed in for 1 – 2 seconds.
2. By interrupting the supply voltage to the motor control system so long that the internal condensers become de-energised and the red and green LED is first lit and then is off.

### 10.3 MIRU Control

Seven different alarms can be shown on the display screen on the control panel of the MIRU Control.

#### No. 1 FAN TRIPPED

The motor control system of the MIRUVENT fan has tripped and initiated a group alarm. To reset the alarm, see Section 10.1 on how to reset alarms.

#### No. 2. FAN COMM. DEFECTIVE

MIRU Control cannot establish correct communication with the MIRUVENT fan control system.

Check that power is being supplied to the MIRUVENT fan and that the green LED on the motor control system is flashing.

To reset the alarm, isolate the power supply for 2 minutes.

#### No. 3 FLOW SENSOR DEFECTIVE

MIRU Control cannot establish correct communication with the pressure sensor for flow measurement.

Check that the pressure sensor is set to Address 0, and that the communication cable is correctly connected. See Section 4.2.

When everything is correct; the lower LED on the pressure sensor should be lit with a steady flow and the upper LED should be flashing.

#### No. 4 PRESSURE SENSOR DEFECTIVE

MIRU Control cannot establish correct communication with the pressure sensor for flow regulation.

Check that the pressure sensor is set to Address 1, and that the communication cable is correctly connected. See Section 4.2.

When everything is correct; the lower LED on the pressure sensor should be lit with a steady flow and the upper LED should be flashing.

#### No. 5 TEMPERATURE SENSOR DEFECTIVE

The MIRU Control unit cannot establish correct communication with the outdoor temperature sensor.

Check that the temperature sensor is correctly connected. See Section 4.3.

#### No. 6 FLOW/PRESSURE DEV.

The airflow or duct pressure continuously deviates by +/-20% from the setpoint.

Check that the tubes to the pressure sensor are correctly connected. See Section 4.2.

#### To reset alarms.

If any of the above alarms are displayed on the control panel, and nothing else is specified on the list of alarms above, reset the alarm by pressing the button under the RESET text on the MIRU Control panel.