Function Guide MIRU, GOLD/MIRUVENT

1. General

The MIRUVENT power roof ventilator can be connected to a GOLD air handling unit. The control equipment of the GOLD unit is fully pre-programmed for controlling the MIRUVENT.

Up to three power roof ventilators can be connected to one GOLD air handling unit by means of bus communication.

2. Material specification

Control of power roof ventilator MIRUVENT via GOLD:

MIRUVENT fan **MIRU-3-aa-bb-c-d**

Pressure sensor, pressure regulation **TBLZ-2-23-aa***

Pressure sensor, flow measurement/regulation **TBLZ-2-23-aa***

aa = code for cable length in metres.
The cable from the pressure sensors must be long enough so it reaches to cable adapter TBLZ-1-64.

Connection kit **TBLZ-1-64**
contains cable adapter and communication cable.

Enclosure EK54 **TBLZ-1-73-1**
Used for cable adapter.

Hand-held terminal, fan motor controller **TBLZ-4-75**
Used for MIRUVENT fans 2 and 3.

Connection to the GOLD air handling unit:

Connection kit **TBLZ-1-64**
Contains cable adapter and communication cable.

Outdoor temperature sensor **TBLZ-1-24-3**

Only for outdoor temperature compensation.

IQlogic+ module **TBIQ-3-2-aa**
Used for external control of MIRUVENT.
Code aa = cable length in metres

Timer, mechanical **ELQZ-1-406-1**
0–2 hour prolonged operation, for surface mounting.

Timer, electronic **TBLZ-2-47**
0-6 hours prolonged operation, for recessed or surface mounting.

Miscellaneous:
Cable 4-conductor for communications to MIRUVENT fan and any outdoor temperature sensor. Twisted pair cable is recommended for distances greater than 15 metres. 24 V DC is routed in one pair and bus communications (A and B) in one pair.

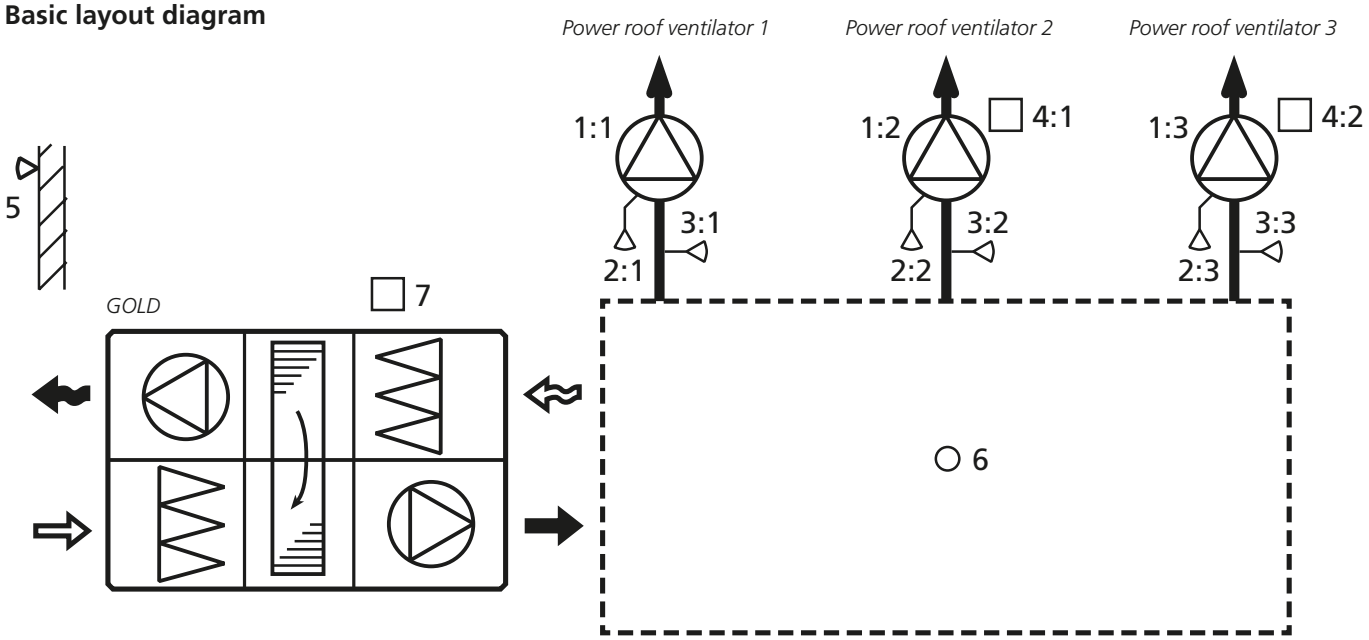
Cable for power supply to the MIRUVENT fan.
1 × 230 V or 3 × 400 V, see separate installation instruction for MIRUVENT.

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

3. Function

Description of functions that are possible to act upon/obtain information about, via the GOLD air handling unit's hand-held terminal or via communications with a main control system

Basic layout diagram



3.1 Control

Up to three power roof ventilators (no. 1:x in the basic layout diagram above) can be connected to one GOLD air handling unit by means of bus communications. Each power roof ventilator obtains its own menu group in the hand-held terminal for the GOLD air handling unit. If more than one power roof ventilator is used, the installation of power roof ventilators two and three is performed via the hand-hand terminal for fan motor controller TBLZ-4-75 (see section 4.3).

It's possible on the GOLD air handling unit's hand-held terminal to select whether the power roof ventilator should be controlled in parallel with the GOLD unit or whether it should follow the low-speed/high-speed operating modes of the air handling unit.

A weekly clock with four time channels for each power roof ventilator gives the possibility of separate control independent of the GOLD air handling unit's operation.

All the time channels can be set separately for each connected power roof ventilator via the GOLD unit hand-held terminal.

There is also provision for an external control system via terminal blocks or timer (accessory mechanical timer ELQZ-1-406-1 or electronic timer TBLZ-2-47, no. 6 in the basic layout diagram). Requires the accessory IQlogic+ module TBIQ-3-2-aa (no. 7 in the basic layout diagram).

3.2 Flow/pressure regulation

3.2.1 Flow regulation

Flow regulation involves operating the power roof ventilator to keep the preset air flow constant. The power roof ventilator fan speed is automatically regulated to provide correct air flow.

The flow is measured by an external pressure sensor (TBLZ-2-23-aa, no. 2:x in the basic layout diagram above) that is installed in or by the power roof ventilator. Here there is also a measurement nipple for flow measurement. The sensor must be connected to the GOLD air handling unit's bus communications.

The required setpoint (separate for low speed and high speed) is set on the GOLD air-handling unit's hand-held terminal.

Min.-/Max. flow

Min.- and max. flow indicates within which limits the fans can work, irrespective of the requirement. Max. flow can be set for each fan while min. flow is fixed.

The flows specified below refer to the fan's theoretical limits and what is possible to set on the GOLD air handling unit's hand-held terminal. Practical flow limits are determined by the external pressure drop.

MIRUVENT	Min. flow (for air flow regulation)		Max. flow	
	m^3/h	m^3/s	m^3/h	m^3/s
-3-25-28-1-1	150	0.042	2000	0.56
-3-25-31-1-1	200	0.056	2900	0.81
-3-35-35-1-1	300	0.083	4000	1.11
-3-35-40-1-1	400	0.11	5900	1.64
-3-35-45-1-1	500	0.14	7500	2.08
-3-45-50-1-1	500	0.14	9800	2.72
-3-45-56-1-1	500	0.14	10400	2.89
-3-45-56-2-1	500	0.14	13600	3.78
-3-56-63-1-1	500	0.14	13600	3.78
-3-56-71-1-2	600	0.17	18300	5.08
-3-71-80-1-2	800	0.22	24300	6.75
-3-71-80-2-2	800	0.22	27200	7.56
-3-71-90-1-2	1000	0.28	33000	9.17

3.2.2 Pressure regulation

The air flow automatically varies to provide constant pressure in the ducting. This type of control is also called VAV regulation (Variable Air Volume).

Pressure regulation is used when, for example, damper operations increase the air volume in parts of the ventilation system.

The duct pressure is measured by an external in-duct pressure sensor (TBLZ-2-23-aa, no. 3:x in the basic layout diagram on the previous page), which is connected to the GOLD air handling unit's bus communications.

The setpoint required (separate for low speed and high speed) is preset in Pa.

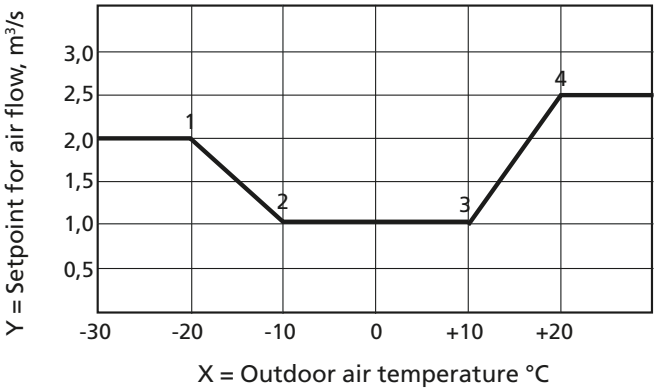
The function can be limited so that the fan speed will not exceed the preset max. values.

3.3 Outdoor air compensation

Outdoor air compensation of the air flow can be activated if you want to change the air flow for specific outdoor air temperatures (requires the accessory outdoor temperature sensor TBLZ-1-24-3, no. 5 in the basic layout diagram on the previous page). An individually adjusted curve regulates the ratio between the air flow and the outdoor air temperature. The curve has four adjustable breakpoints.

If the function is selected solely for low speed or high-speed operation, the curve will regulate only one of these. The air flow for the operating case that has not been selected will then be according to the preset setpoint for air flow/duct pressure.

In flow regulation mode, the current setpoint for air flow changes. When pressure regulation is selected, the current setpoint for pressure changes.



Example:
Flow regulated power roof ventilator. The same principle can be applied to a pressure regulated power roof ventilator. However this will cause a reduction in pressure in Pa.

If the outdoor air temperature is below -20 °C (X1), the flow setpoint will be a constant 2.0 m3/s (Y1).

If the outdoor air temperature is between -20 °C (X1) and -10 °C (X2), the air flow will decrease from 2.0 m3/s (Y1) to 1.0 m3/s (Y2) as shown in the curve.

If the outdoor air temperature is between -10 °C (X2) and 10 °C (X3), the flow setpoint will be a constant 1.0 m3/s (Y2 and Y3).

If the outdoor air temperature is between 10 °C (X3) and 20 °C (X4), the air flow will increase from 1.0 m3/s (Y3) to 2.5 m3/s (Y4) as shown in the curve.

If the outdoor air temperature is over 20 °C (X4), the flow setpoint will be a constant 2.5 m3/s.

3.4 Balanced ventilation

The balanced ventilation function can be used if the power roof ventilators are used for variable flow. It is then possible to select which power roof ventilator(s) is/are to be included in the function.

In the case of balanced extract air, all the air flows of the activated power roof ventilators are added together. The extract air flow in the GOLD air handling unit decreases with the corresponding volume, and in doing so the supply air flow will be the same as the total extract air flow and balanced ventilation will be achieved inside the building.

In the case of balanced supply air, all the air flows of the activated power roof ventilators are added together. The supply air flow in the GOLD air handling unit increases with the corresponding volume, and in doing so the supply air flow will be the same as the total extract air flow and balanced ventilation will be achieved inside the building.

3.5 Readings

The following values can be read in the GOLD unit hand-held terminal for each power roof ventilator:

Air flow*. Duct pressure*. Current setpoint for flow/pressure*. SFP. Power. Power consumption in kWh. Operating mode. Active alarm and alarm history.

**Shown depending on which sensor is connected.*

3.6 Base setting

The fan size can be set.

Flow regulation or pressure regulation can be selected.

When pressure regulation and air flow are activated, the power roof ventilator is controlled by pressure regulation and the air flow can be read at the same time.

3.7 Communications

This also offers you the opportunity of communications with a main control system via GOLD for all the connected power roof ventilators. Modbus TCP, Modbus RTU, Exoline or BACnet IP.

You can then read and set the values for pressure and flow. All of the time channels can be set for each power roof ventilator. Provision for reading energy and common alarms.

3.8 Web page

There is an icon on the GOLD air handling unit's built-in web page for navigating to the MIRUVENT power roof ventilators. The required power roof ventilator (1–3) can be selected under this icon for entering and reading the settings.

You can then read and set the values for pressure and flow. All of the time channels can be set for each power roof ventilator. Provision for reading energy and common alarms.

You also have the capability via the web page to parallel control with GOLD, stop, low-speed, high speed and manually reset tripped alarms.

4. Communication

Install the GOLD air handling unit and MIRUVENT power roof ventilator physically and connect the power supply, see separate installation instructions.

4.1. MIRUVENT power roof ventilator and GOLD air handling unit

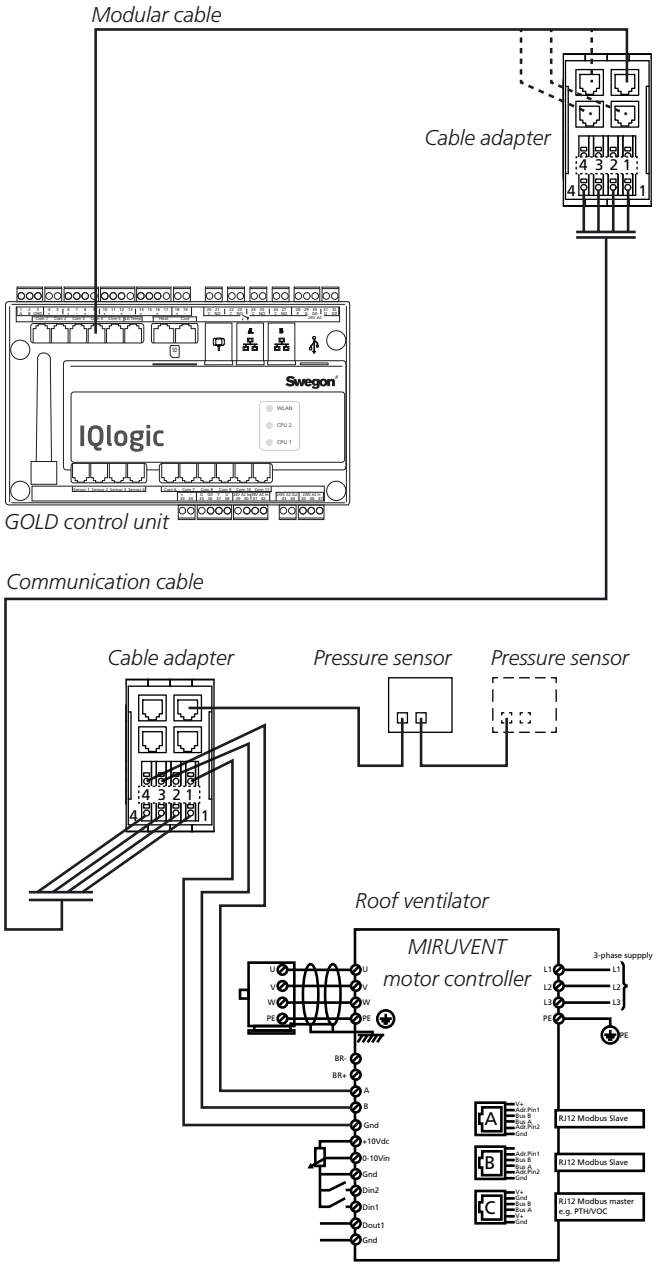
4.1.1 Cable adapter

Connection to the GOLD air handling unit requires the TBLZ-1-64 connection kit accessory. The connection kit contains a cable adapter and communication cable.

Mount the cable adapter on the DIN rail in the GOLD air handling unit's electrical cabinet or in another appropriate position close to this.

Connect the modular cable between the optional modular connection on the cable adapter and the modular connection labelled "COM4" on the control unit in the GOLD air handling unit. See the illustration.

A 4-conductor cable must be connected between each cable adapter for communications. Twisted pair cable is recommended for distances greater than 15 metres. 24 V DC is routed in one pair and bus communications (A and B) in one pair.



4.1.2 1 MIRUVENT power roof ventilator

Connection to the MIRUVENT fan requires the TBLZ-1-64 connection kit accessory. This is ideally placed in the TBLZ-1-73-1 enclosure (accessory).

Connect a 3-conductor cable to terminals A, B and GND on the motor controller in MIRUVENT. See the illustration.

Cables are not included in the delivery. Twisted-pair cables are recommended.

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

The attendant pressure sensor TBLZ-2-23-aa is connected to an optional modular connector on the cable adapter.

4.1.1 2–3 MIRUVENT power roof ventilators

Up to three power roof ventilators can be connected to one GOLD air handling unit by means of bus communication.

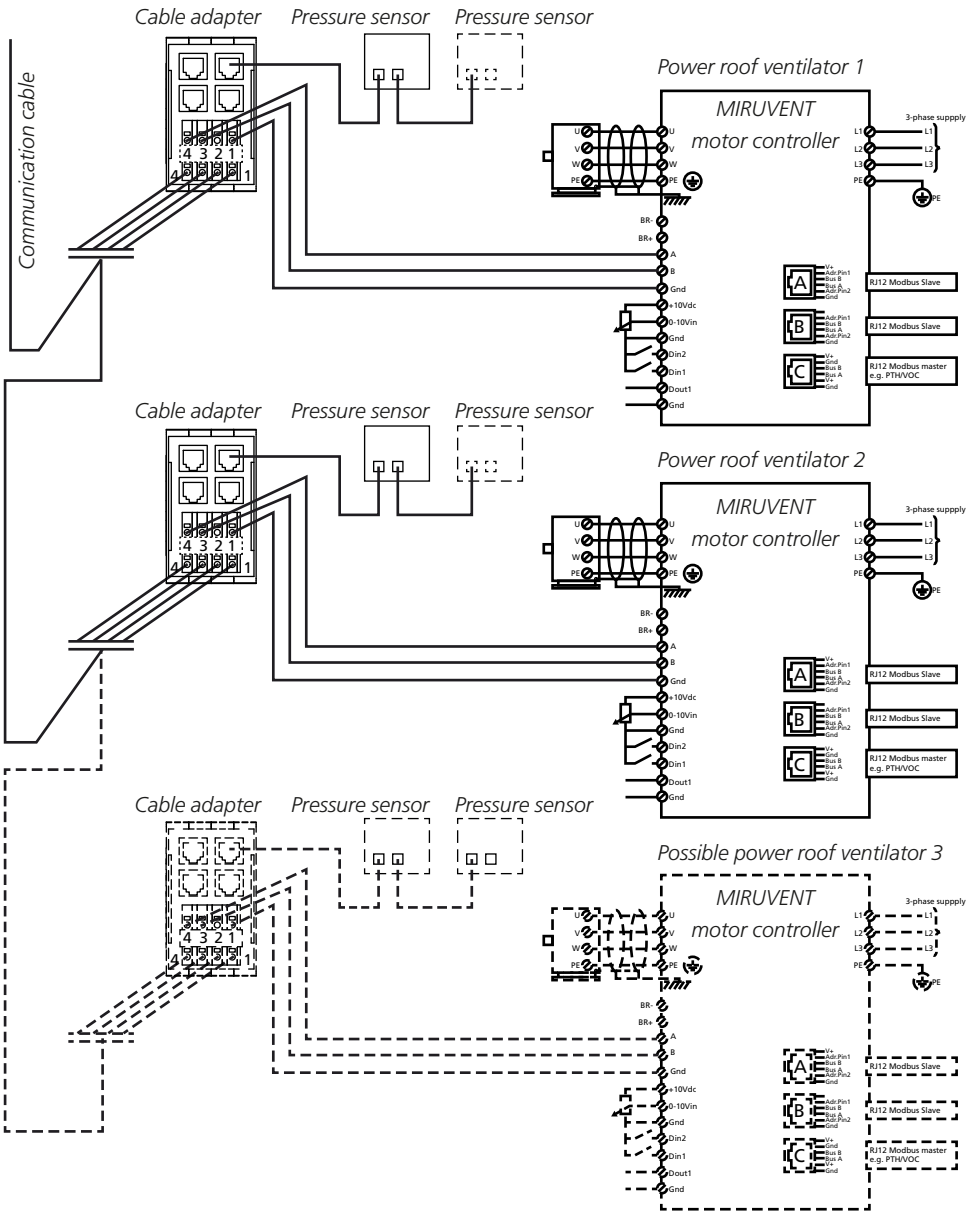
Connection of each MIRUVENT fan requires the TBLZ-1-64 connection kit accessory. This is ideally placed in the casing TBLZ-1-73-1 (accessory).

Connect a 3-conductor cable to terminals A, B and GND on the motor controllers in MIRUVENT. See the illustration.

Cables are not included in the delivery. Twisted-pair cables are recommended.

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

The attendant pressure sensor TBLZ-2-23-aa is connected to an optional modular connector on the cable adapter.



4.2. Pressure sensor TBLZ-2-23-aa

The encapsulated pressure sensor is available in two variants, one with a function selector switch (variant 1) and one with a DIP switch (variant 2).

For ***pressure regulation,*** the pressure sensor must be mounted on or in connection to the MIRUVENT fan's extract air duct. Connect the tube as illustrated to the right.

The pressure sensor may need to be placed further out in the duct system, depending on the design of the duct system, to register pressure changes correctly. Set the function selector switch/ DIP switch on the pressure sensor (see the illustrations to the right) to the mode as set out in the tables below.

For ***flow regulation,*** the pressure sensor can be installed in a suitable space inside the MIRUVENT fan, or by the flow measurement nipple on the side of the power roof ventilator. Connect the tubes as illustrated to the right. Set the function selector switch/DIP switch on the pressure sensor (see the illustrations to the right) to the mode as set out in the tables below.

Variant 1,
pressure sensor with function selector switch

Function selector switch	MIRUVENT
0 = Flow regulation	No. 1
1 = Pressure regulation	No. 1
2 = Flow regulation	No. 2
3 = Pressure regulation	No. 2
4 = Flow regulation	No. 3
5 = Pressure regulation	No. 3

Variant 2,
pressure sensor with DIP switch

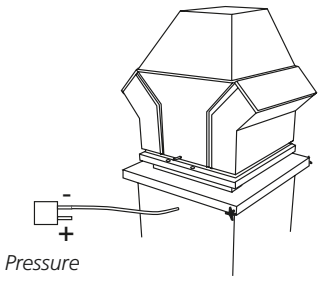
	Switch no. (1=ON 0=OFF)				
Function/MIRUVENT	**1**	**2**	**3**	**4**	**5**
0 = Flow regulation/No. 1	0	0	0	0	0
1 = Pressure regulation/No. 1	1	0	0	0	0
2 = Flow regulation/No. 2	0	1	0	0	0
3 = Pressure regulation/No. 2	1	1	0	0	0
4 = Flow regulation/No. 3	0	0	1	0	0
5 = Pressure regulation/No. 3	1	0	1	0	0

Connect the modular cable to an optional modular connection on the pressure sensor. See the illustrations to the right.

If the pressure sensors for pressure regulation *and* for flow measurement are used, these can be connected in series.

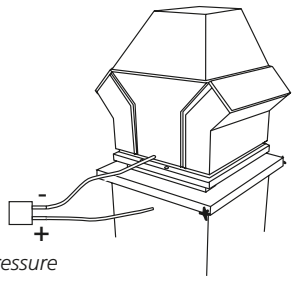
The pressure sensors are a part of the same communication circuit as the power roof ventilators. Depending on the placement, they can be connected to an optional bus connector on the nearest cable adapter included in the communication circuit.

Pressure regulation



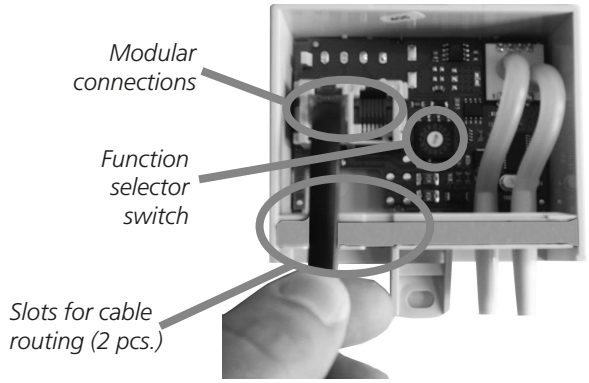
Pressure sensor

Flow regulation

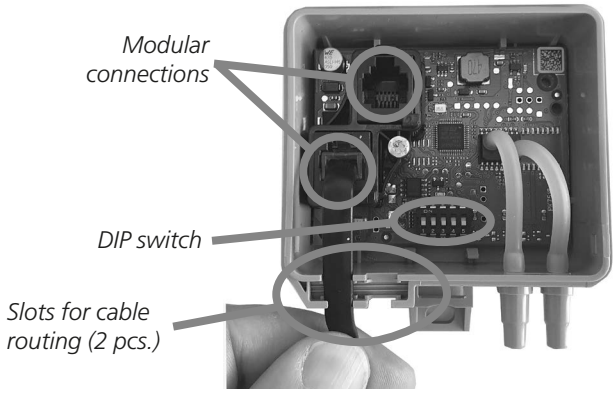


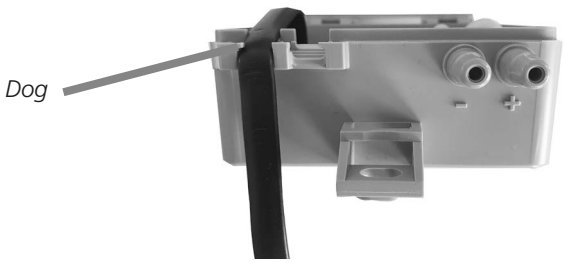
Pressure sensor

Variant 1. Pressure sensor with function selector switch



Variant 2. Pressure sensor with DIP switch





Note: *Make sure that the cable is placed correctly in the slot so that it ends up under the dog. Otherwise, the cable may be clamped and damaged by the cover.*

4.3 MIRUVENT power roof ventilators 2 and 3

When connecting more than one power roof ventilator to a GOLD air handling unit, the Modbus address must be changed on power roof ventilators 2 and 3. This is done with a hand-held terminal for fan motor controller (TBLZ-4-75, accessory).

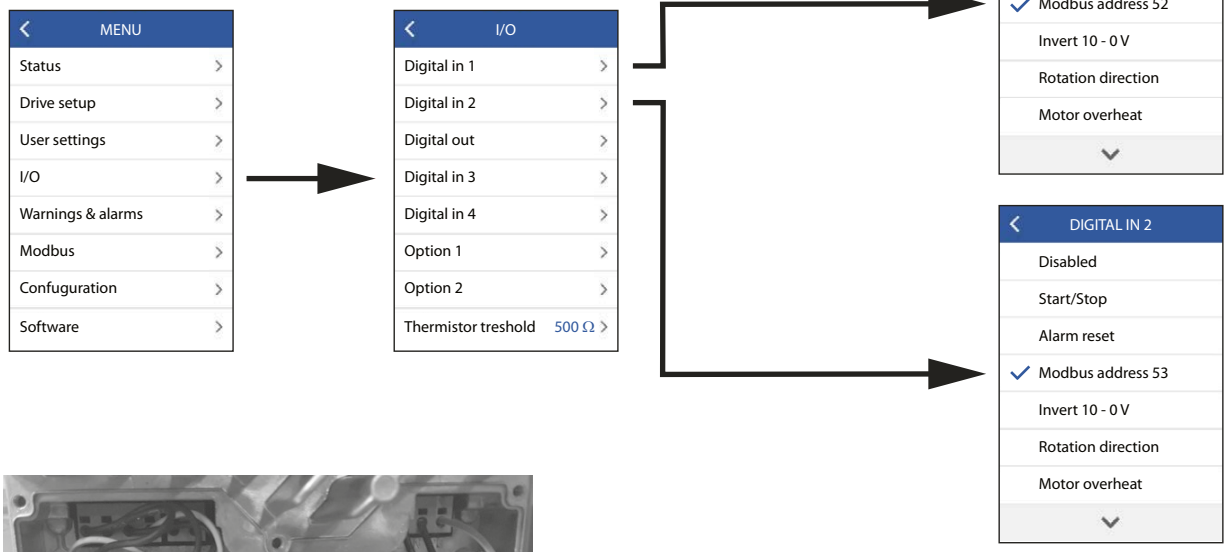
For general operation and connection of the hand-hand terminal TBLZ-4-75, see the separate instruction.

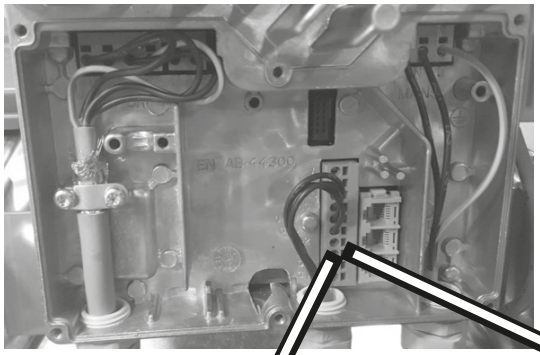
For power roof ventilator 2, the function for Digital in 1 should be changed to Modbus address 52. A jumper should also be fitted on the motor controller's terminal block.

For power roof ventilator 3, if fitted, the function for Digital in 2 should be changed to Modbus address 53. A jumper should also be fitted on the motor controller's terminal block.

See illustrations below.

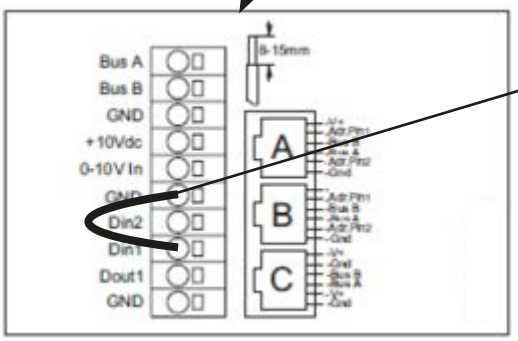
Start menu on hand-held terminal TBLZ-4-75



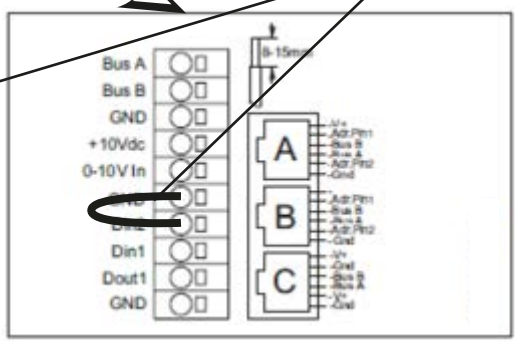


MIRUVENT motor controller

Jumper



Power roof ventilator, MIRUVENT 2.



Possible power roof ventilator MIRUVENT 3.

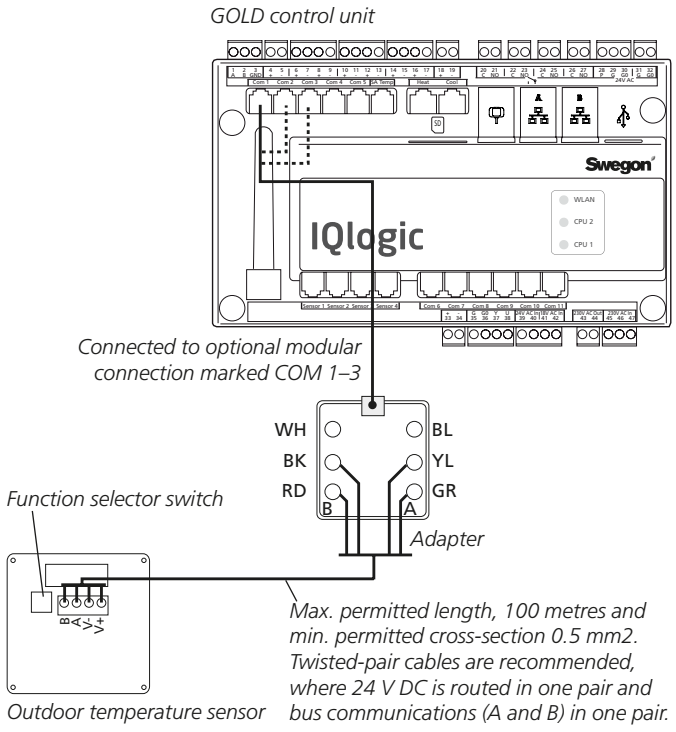
4.4 Outdoor temperature sensor

When the outdoor temperature compensation function is selected, the outdoor temperature sensor TBLZ-1-24-3 should be connected to the GOLD air handling unit's control unit.

Outdoor temperature sensor TBLZ-1-24-3 is also used for other functions on GOLD. This means that if there is already an outdoor temperature sensor connected to the GOLD air handling unit, no extra outdoor temperature sensor is required for MIRUVENT. Refer to the separate instruction for installation of the sensor, and if more than one outdoor temperature sensor is used.

TBLZ-1-24-3 consists of one outdoor temperature sensor, a three-metre-long modular cable and an adapter to the four conductor cable.

The outdoor temperature sensor has a function selector switch which should be set to position A-D. If one sensor is to be used this is set to position A, if two sensors are used this should be set to position A and B and so on.



Connect the leads according to the following:

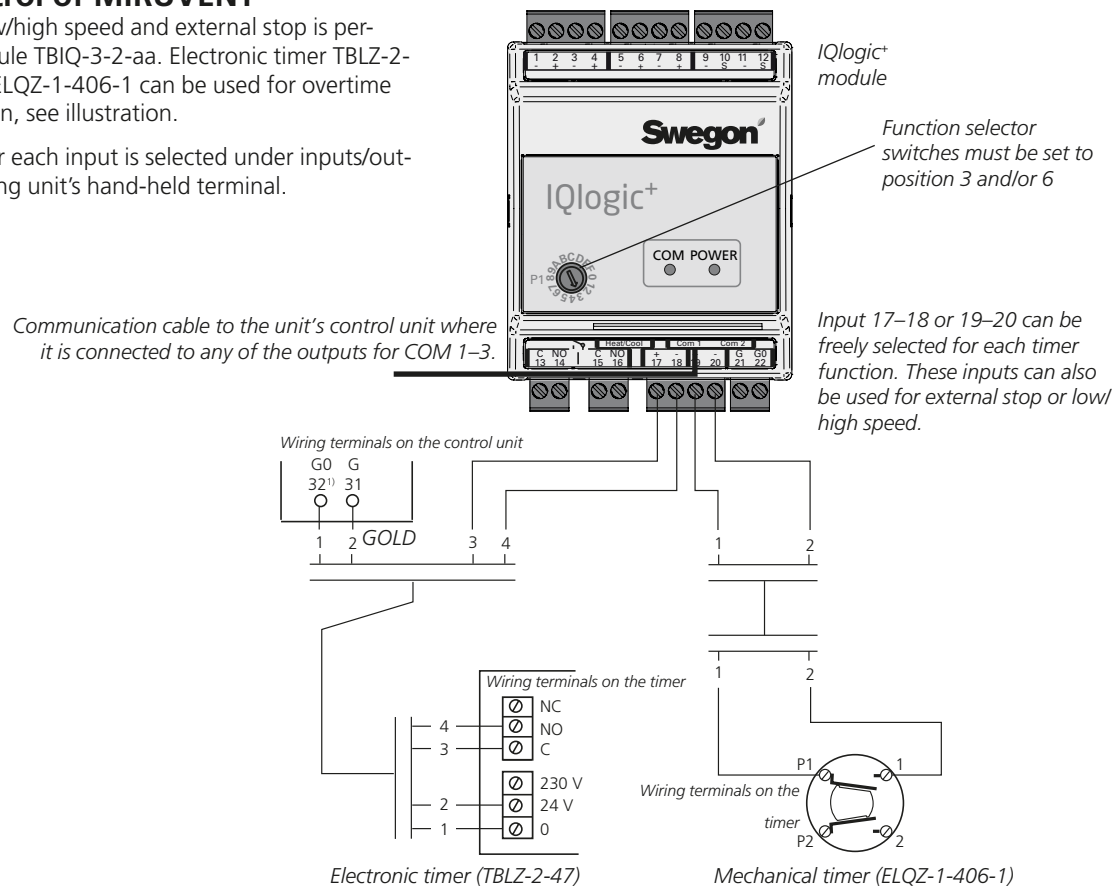
Adapter Temp. sensor

Screw GR	Terminal A
Screw RD	Terminal B
Screw BK	Terminal V-
Screw YL	Terminal V+

4.5 External control of MIRUVENT

Possibility of external low/high speed and external stop is performed via IQlogic+ module TBIQ-3-2-aa. Electronic timer TBLZ-2-47 or mechanical timer ELQZ-1-406-1 can be used for overtime operation. For connection, see illustration.

The required function for each input is selected under inputs/outputs on GOLD air handling unit's hand-held terminal.



8. Operating settings

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

Reading

The number of active fans 1–3 is selected under function.

Function

The operating level is selected under fan 1–3 for each fan:

- which flows or pressure the MIRUVENT fan will work with at low speed and high speed: All values can be set, but only those for the active function (flow control or pressure regulation) apply.

Fans 1–3, operating mode

Under outdoor compensation you can select for each fan:

- whether outdoor compensation should be active
- whether compensation should apply to low speed, high speed or low and high speed.
- whether outdoor compensation is active, all four breakpoints must be set.

Fans 1–3, outdoor compensation

Fans 1–3, function

The function is selected under fan 1–3 for each fan:

- type of parallel operation function

Inactive means that the power roof ventilator is not operated together with GOLD and it cannot be controlled by the internal time channel or external low/high-speed inputs unless the balancing function is selected. If this function is selected, the power roof ventilator can be controlled via the internal time channels and external low/high-speed inputs.

Parallel start. When GOLD is stopped, the power roof ventilator is also stopped. At other times (when GOLD is operational) the power roof ventilator runs at low/high speed according to the set times in the internal time channels or external inputs.

Parallel low/high speed. The power roof ventilator runs in parallel low/high with GOLD. When GOLD is stopped, other operating times can be set on the internal time channels or controlled via the external low/high-speed inputs.

Parallel start and low/high speed. The power fan ventilator runs completely in parallel with GOLD. The internal time channels should not be used for this setting.

- if MIRUVENT shall work together with the GOLD air handling unit's fans so that automatic balancing of the flow occurs.
- which of the GOLD air handling unit's fans should work to balance the total flow. If supply air is selected, the supply air flow in the GOLD air handling unit increases with the equivalent amount. If extract air is selected, the extract air flow in the GOLD air handling unit decreases with the equivalent amount.
- required regulation type. Air flow, duct pressure or duct pressure and air flow. It is also possible to set slave control for GOLD SD. Slave control can be selected with either a percentage difference or a fixed difference in relation to the supply air flow.
- the current size for MIRUVENT.

Fans 1–3, schedule settings

The schedule settings are selected under fan 1–3 for each fan:
- operation/times for all four channels.
Operation: low speed or high speed.

Time: If the same operating times are to apply every day of the week (Mon.–Sun.), you need only programme one time channel. Various operating 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 schedule settings do not have any effect.