

DUCO cabling:

Introduction:

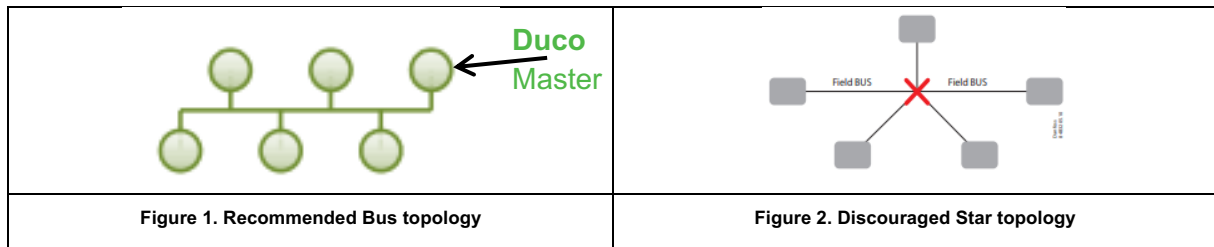
This user guide provides general information about Duco's data cabling. It explains how the cabling and connections run over the Duco network. Creating a network means connecting devices to a communication bus. To make this possible, reliable and high-quality strict rules must be followed. The RS-485 protocol uses a master/slave architecture, where each slave responds to its unique address and only responds to request packages addressed to this device. The request packages are generated by the master, which periodically checks all connected slave devices over the bus.

Further information on the RS 485 protocol used can be consulted via the links below:

- <http://www.ti.com/lit/an/slla272c/slla272c.pdf>
- <http://www.ti.com/lit/an/snla042a/snla042a.pdf>

RS 485 topology:

Duco components must be daisy-chained (= recommended). This means that for each component a separate cable is not required and even discouraged (= star structure). A bus allows a **branch of up to 3 metres**.



Information about cable type:

DUCO WIRED	
Power supply	24 VDC
Wiring	3 cores, 0.8 mm each for communication (A, B, GND)
Maximum distance	up to 300 m
Maximum number of components	up to 99 wired components in a single system

Duco @Home

If the cable is only in a duct and there are few external current factors (magnetic fields) present, a standard 5x 0.75 mm² cable is sufficient.

The power supply and communication are then together in one cable. The cable must have 5 cores of at least 0.75 mm². This application is only possible if there is no external influence that will disrupt data communication (typically: housing construction).

(E.g. Duco Comfort (Plus), Tronic (Plus), Energy Premium, Eco System)

Duco @Utiliteit

Duco recommends the use of a shielded cable for utility applications. This is to prevent any interference that may affect the data communication. For the sake of simplicity, the following rule of thumb may be applied:

- If the cable is only in a duct and there are few external current factors (magnetic fields) present, a standard 5x 0.75 mm² cable is sufficient.
- If a COAX, power or high-voltage power cable is installed in a duct, a shielded cable is recommended.

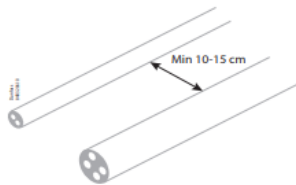


Fig. 3 Distance between power cable and data cable.
magnetic fields

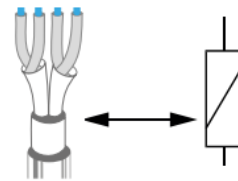


Fig. 4 Maintain distance from relays and electric

- Isolated power and communication cable:
 - Power supply: 2x 1.5 mm²
 - Communication: 3x 0.75 mm² (twisted/shielded)



Use a twisted pair of conductors to connect the differential signals and use another conductor (e.g. a second twisted pair) to connect the Gnd. The shield must be connected to the Gnd or to the earthing on one side. All shields must be interconnected.

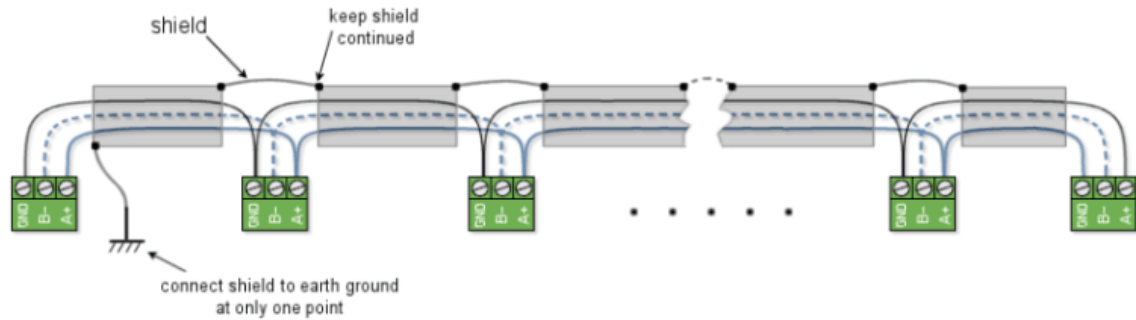


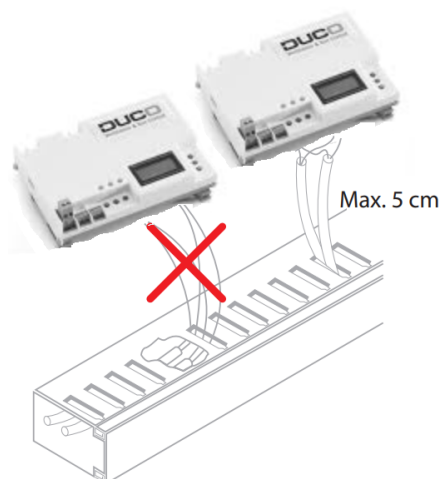
Fig. 6 – Recommended bus wiring

Bear in mind voltage drops at low voltages:

The voltage drop is independent of the input voltage but depends on the resistance of the conductor. Therefore, the voltage drop is proportionally greater at low voltages. To influence the voltage drop due to cabling, the length of the cable, the thickness of the cable and the voltage can be varied. Correct section determination is therefore essential for the safe and correct functioning of an electrical installation.

Connecting Duco components:

Route the cabling as close as possible to the Duco components and branch the wires to the screw terminals only for the shortest possible distance. Do not use different types of wire on a network, even for short distances. The cable may only be stripped over a minimum distance in accordance with the applicable legal standards.



AC/DC Power supply 24 VDC out to EN60335:

Features:

- Voltage 230 VAC/24 VDC (max. 2.5 A)
- Protected against no-load operation and short-circuiting
- Thermal overload protection
- Complies with EN60335.

Small network: Central power supply:

A single central power supply can be used. Central power supplies are not included in the system or in the Duco catalogue. The capacity of the power supply can be determined depending on the number of Duco components in the system, taking into account the corresponding technical data sheet for each component. However, do take into account voltage drops over longer distances in order to comply with the technical data sheet for each component.

Large network: Power supply by component

When there is doubt about the voltage drops in the network or the distances become very large, it is recommended that large consumers are supplied separately by component or by group.

Determine capacity of the power supply

The capacity required for the power supply can be determined on the basis of the sum of the known components in the house, including the expected voltage drop.

Example:

X number of Duco components:

Master	Power
IQ-unit	1.7 W

Number	Slaves	Watts per unit	Number x Watts/unit	Total power
5	User controls and sensors	1.6 W	5 x 1.6 W	8 W
2	Intelli air valve	7 W	2 x 7 W	14 W
8	Tronic vents	1.5 W	8 x 1.5 W	12 W
1	Duco Weather Station	0.24 W	1 x 0.24 W	0.24 W
1	Actuator	1.2 W + M	Max 48 W	48 W
1	1 actuator with 1 DucoGrille Nightvent	18.2W	1 x 18.2 W	18.2 W
1	1 actuator with DucoGrille Close 105	2.7 W	1 x 2.7 W	2.7 W
1	1 actuator with 2 DucoGrille Nightvents	18.2 W	2 x 18.2 W	36.4 W
1	1 actuator with 10 DucoGrille Close 105	2.7 W	10 x 2.7 W	27 W
<u>Total System power:</u>		168.24 W		

Time-sharing of power with Actuator control:

The Duco master controls up to 20 actuators or grilles at the same time so that the total power of the circuit is not loaded at the same time. This time-sharing of grilles and actuators can be changed to a different value. Please refer to the installation guide of the IQ-unit.

DUCO COMPONENTS

MASTERS:

DUCO IQ – Unit	
Data sheet	
Installation guide	
DUCOBOX Focus/Silent Connect	
Data sheet	
Installation guide	
DUCOBOX Energy Premium	
Data sheet	
Installation guide	
Intelli Air Valve (possibility to use as slave component)	
Data sheet	
Installation guide	

SLAVES:

Duco User Controller and Sensors	
Data sheet	
Installation guide	
DucoTronic control units	
Data sheet	
Installation guide	
Duco Actuator Control	
- Standard	
Data sheet	
Installation guide	
- DucoGrill NightVent	
Data sheet	
Installation guide	
- DucoGrill Close	
Data sheet	
Installation guide	

EXTERNAL COMPONENTS/CONTROLS

External central extract unit/switch sensors	
IQ DIN installation guide	
Data sheet	
- Duco Weather Station	
Data sheet	
- Modbus coupling:	
Information sheet	

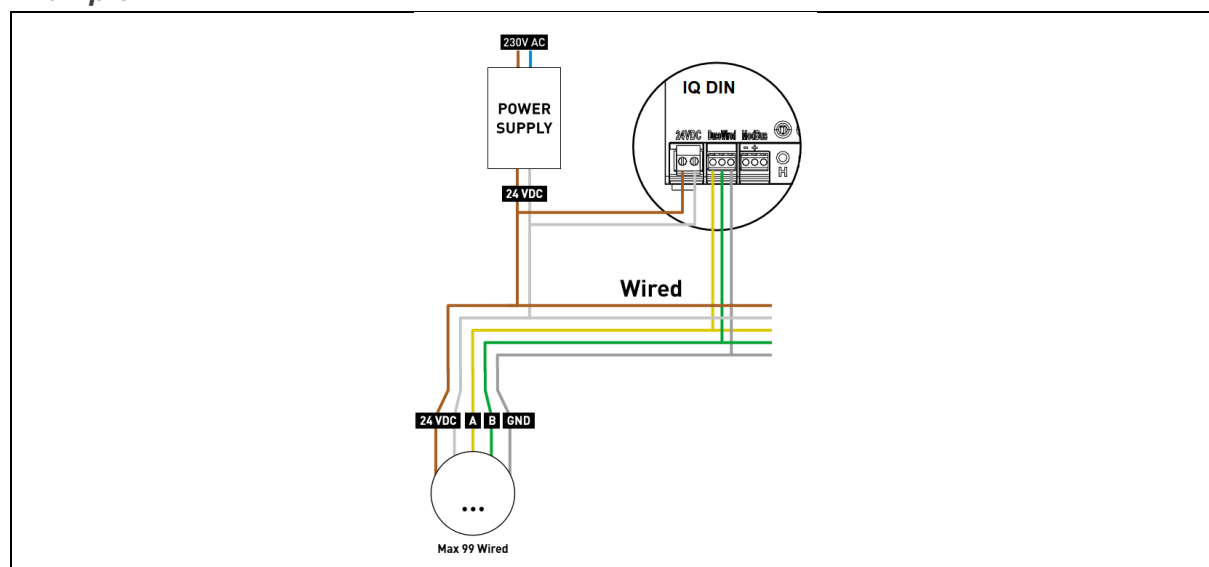
Masters

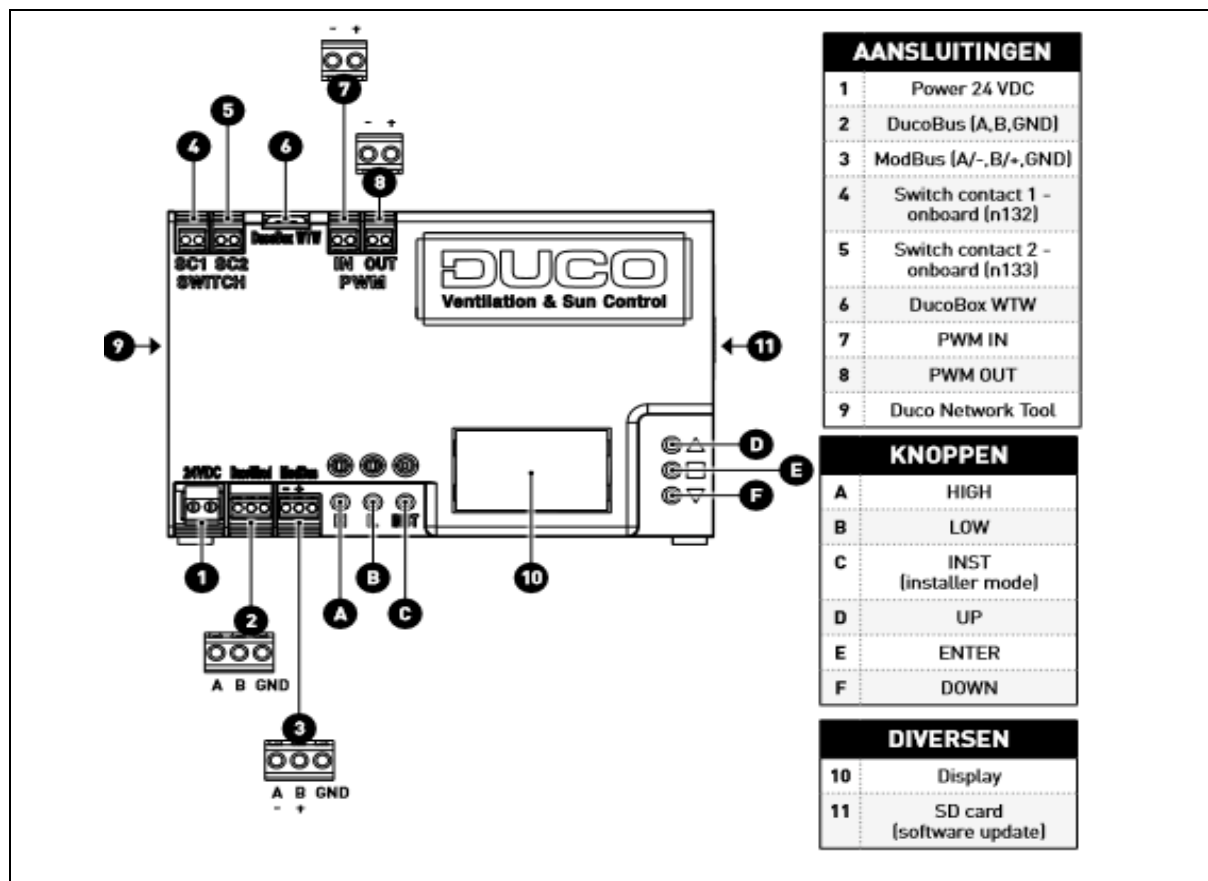
Duco IQ Unit:

Electric specifications

Communication	RF and Wired
Display	2 x 8 digits
Pushbuttons	6
LEDs	3
Connections	24 VDC power supply Duco Wired ModBus 2 x Switch Sensor (volt-free input) PWM IN PWM OUT
Power supply	24 VDC
Power	1.7 W
Reverse polarity protection	Graetz bridge

Example:





DucoBox Focus/Silent Connect

Connection:

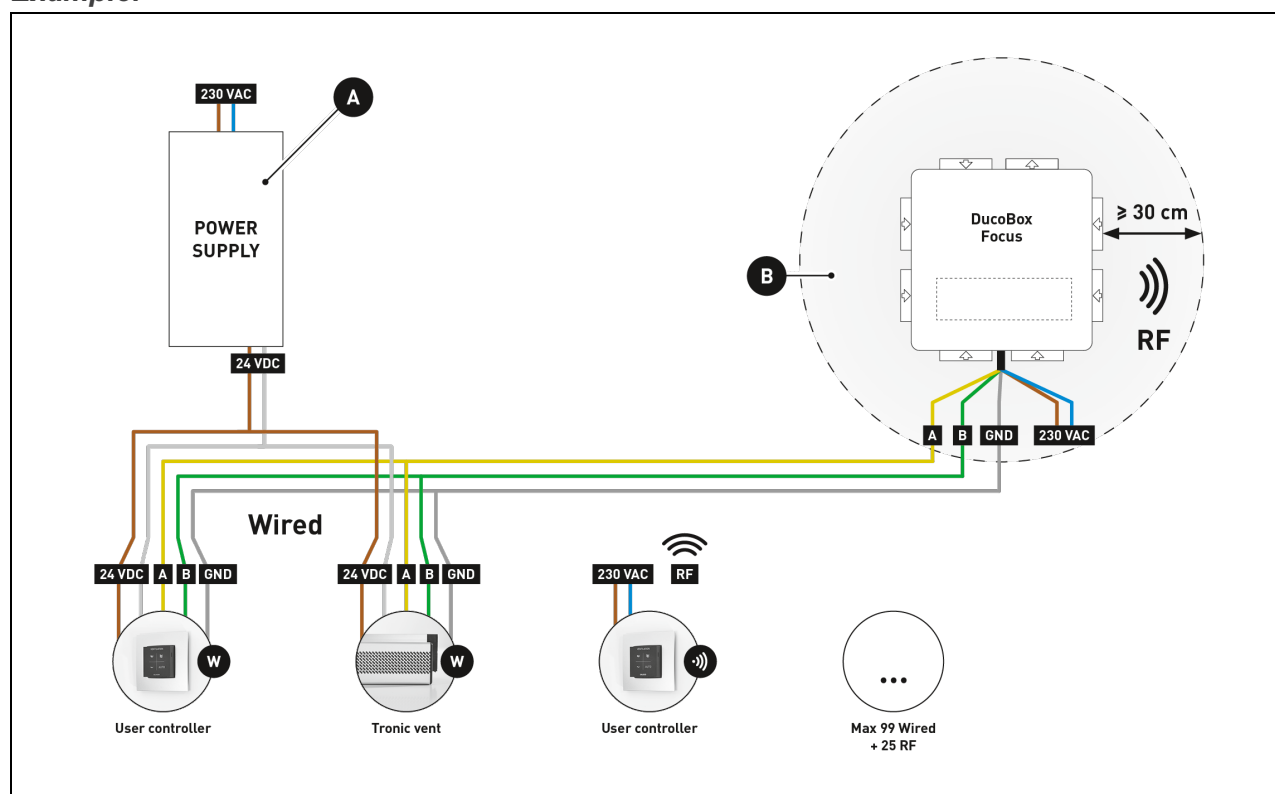
Electric specifications

Unom	230 VAC – 50 Hz	Inom	0.65 A
Pmax	84 W	Cos	0.55

Power supply:

- 230 V, 50 Hz
- Via 3-core power cable with earthed plug

Example:

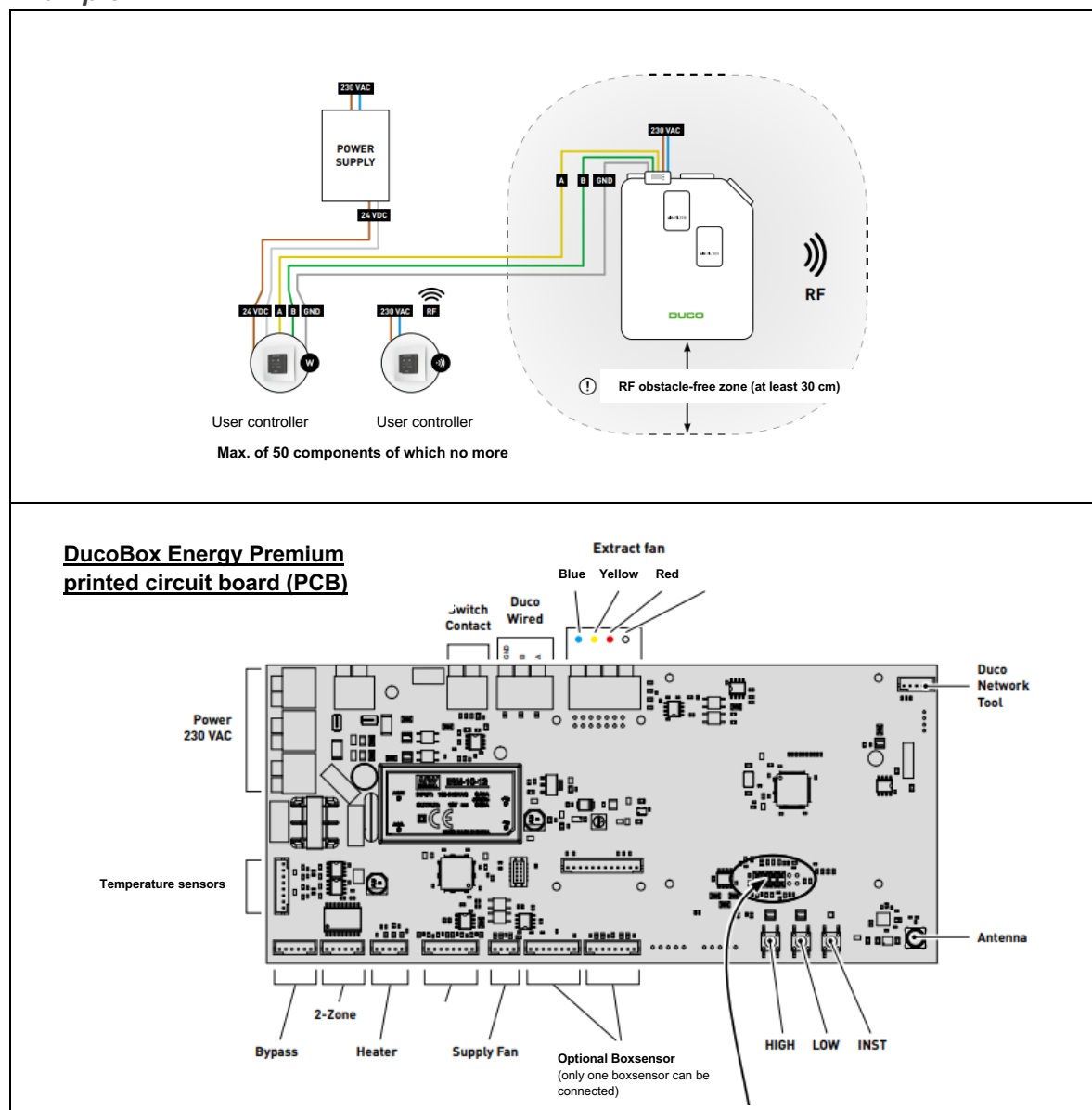


DucoBox Energy Premium:

Electric specifications

Maximum power at 150 Pa	120 W (2 x 60 W)
Maximum heater power	1000 W
Power supply	230 V, 50 Hz Via 3-core power cable with earthed plug
Contacts	0-10 V in/outputs
Type of motor	DC
IP class	IP 40
Energy conversion efficiency	At 228 m³/h: 87% At 275 m³/h: 86% At 332 m³/h: 85%
Reverse polarity protection	Graetz bridge

Example:

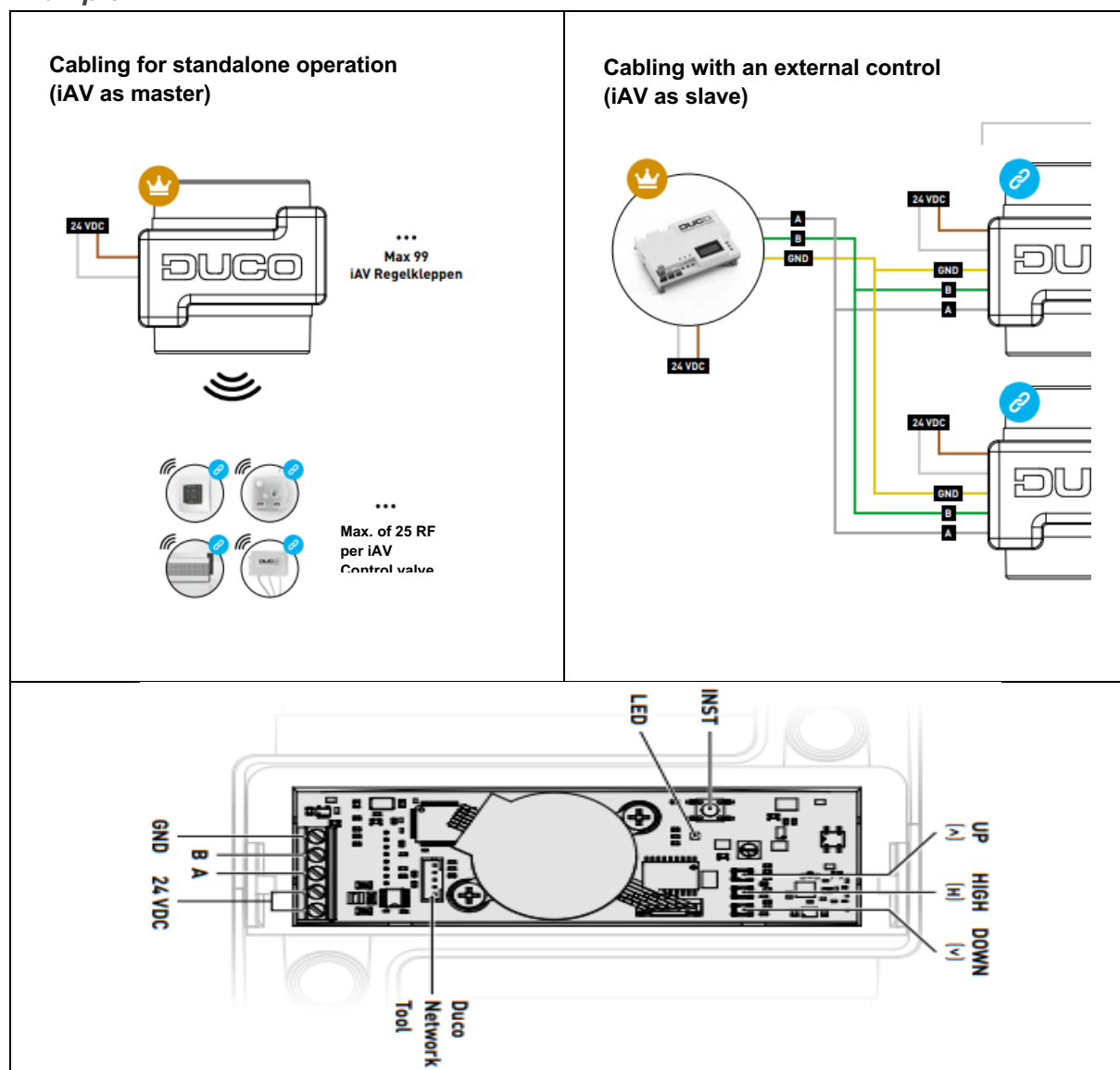


Duco Intelli Air Valve 125/160:

Electric specifications

Power supply	24 VDC
Power	Standby: 0.4 W Peak: 7 W
Communication	Duco RF with underlying components. Duco Wired connection with any IQ-unit.
Sensors	Temperature (CO ₂ and Humidity Control Valve only) CO ₂ (CO ₂ Control Valve only) Relative humidity (Humidity Control Valve only)
RH range	0 – 100 % RH
CO₂ range	300 – 2,000 ppm
CO₂ accuracy	40 ppm +/- 5%

Example:



Slaves

Duco User Controllers and Sensors

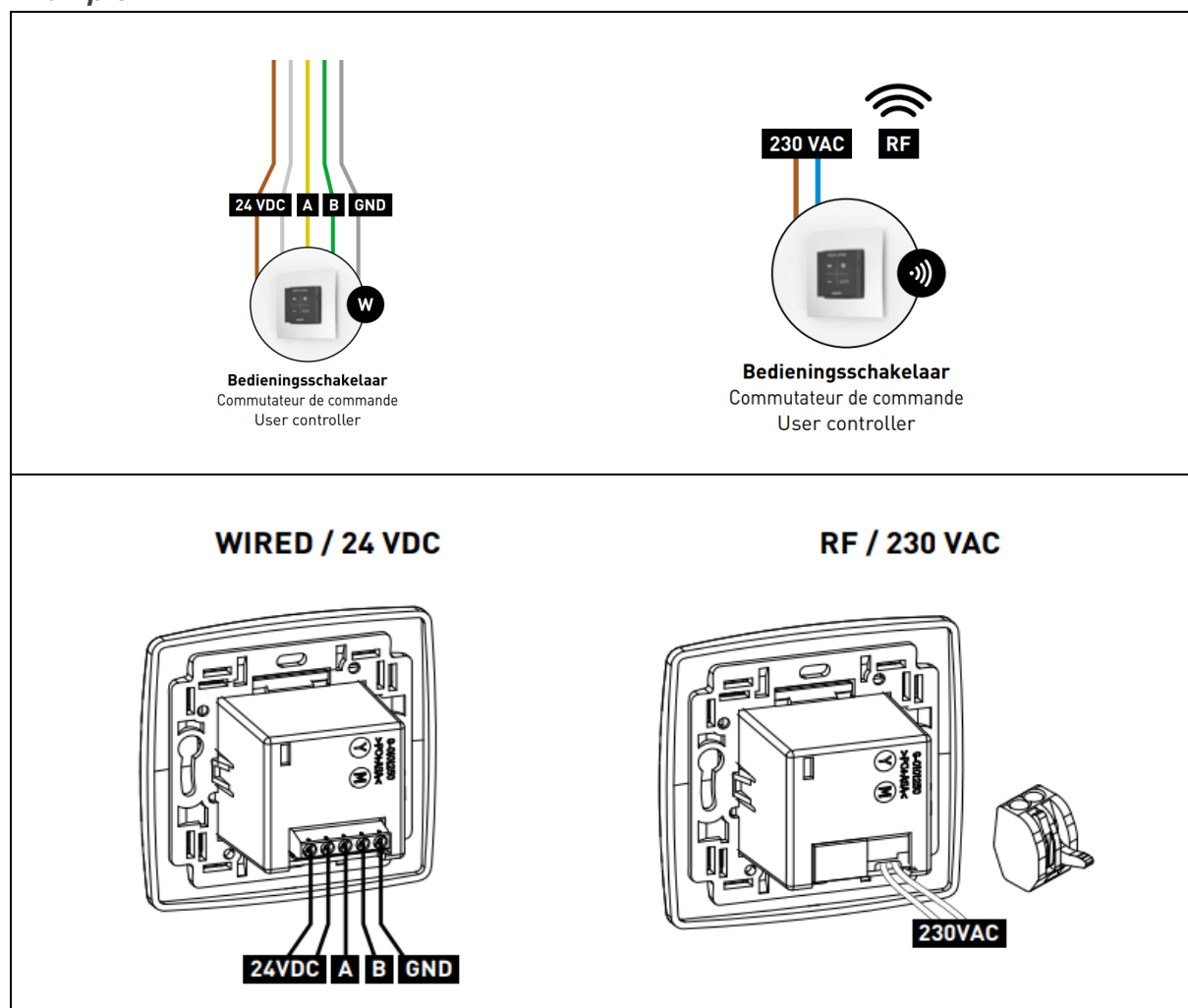
Electric specifications

Power supply	RF: 230 VAC Wired: 24 VDC RF/Battery: CR2430 3V coin cell battery
Peak power	RF: 1.3 W Wired: 0.8 W
Standby power	RF: 1.2 W Wired: 0.7 W
Communication	RF or Wired

Operating conditions

Temperature	0 °C – 40 °C
Humidity	Not water-resistant

Example:



DucoTronic control units

Tronic Top 50 Tronic GlasMax/MiniMax/Max TronicVent/TronicTwin (Wired only!)

General specification

Peak power: 1.5 W
Stand-by power: 0.5 W
Power supply: Wired: 24 VDC

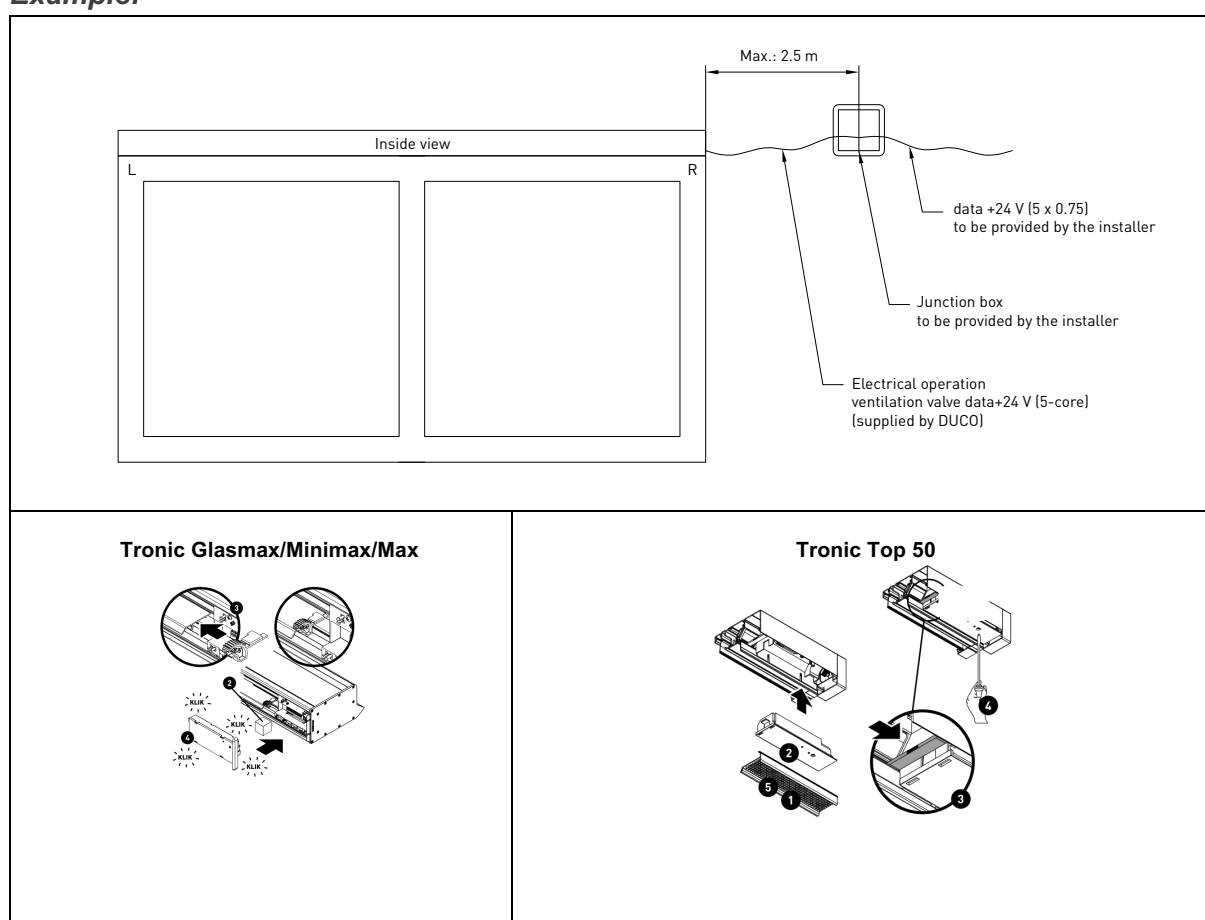


A 3-metre length of cable to the grille is provided as standard. To connect the cable to the network a switch box must be provided in the wall at a maximum distance of 3 metres.

Note:

Depending on the type of grille, a control unit is supplied for separate installation or pre-fitted in a made-to-measure inner grille. The power supply cable is always on the right-hand side of the grille viewed from inside.
For further information, please refer to the installation instructions for each grille!

Example:

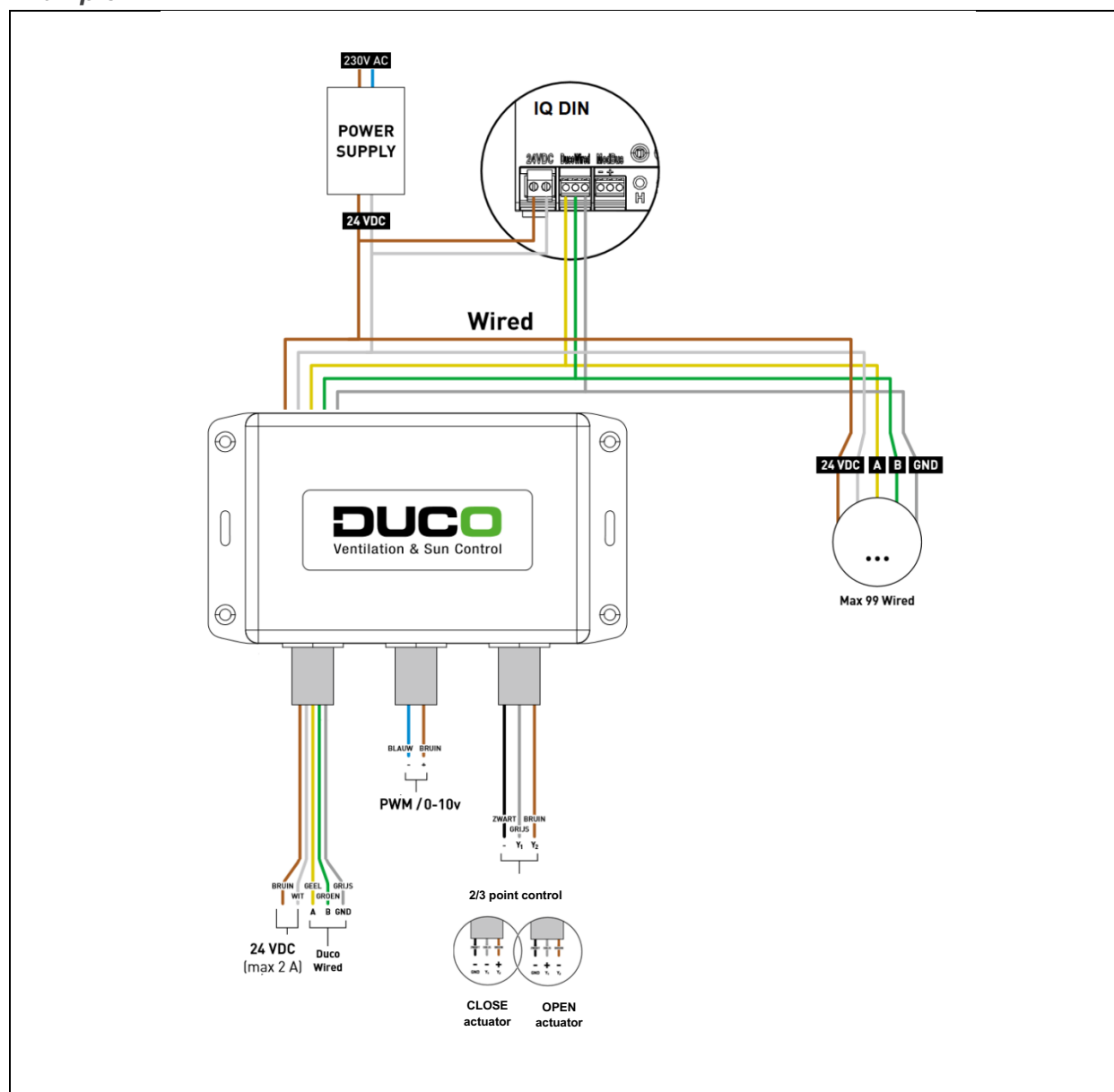


Duco Actuator Control (standard)

Electric specifications

Communication	Wired
Power supply	24 VDC
Connections	2- or 3-point control (3 cores) PWM out (2 cores) Duco Wired (5 conductors)
Power	1.2 W (+ capacity of the actuator motor)
Actuator motor power supply	24 VDC/max. 2 A
Reverse polarity protection	Graetz bridge

Example:



Actuator control with DucoGrille Nightvent

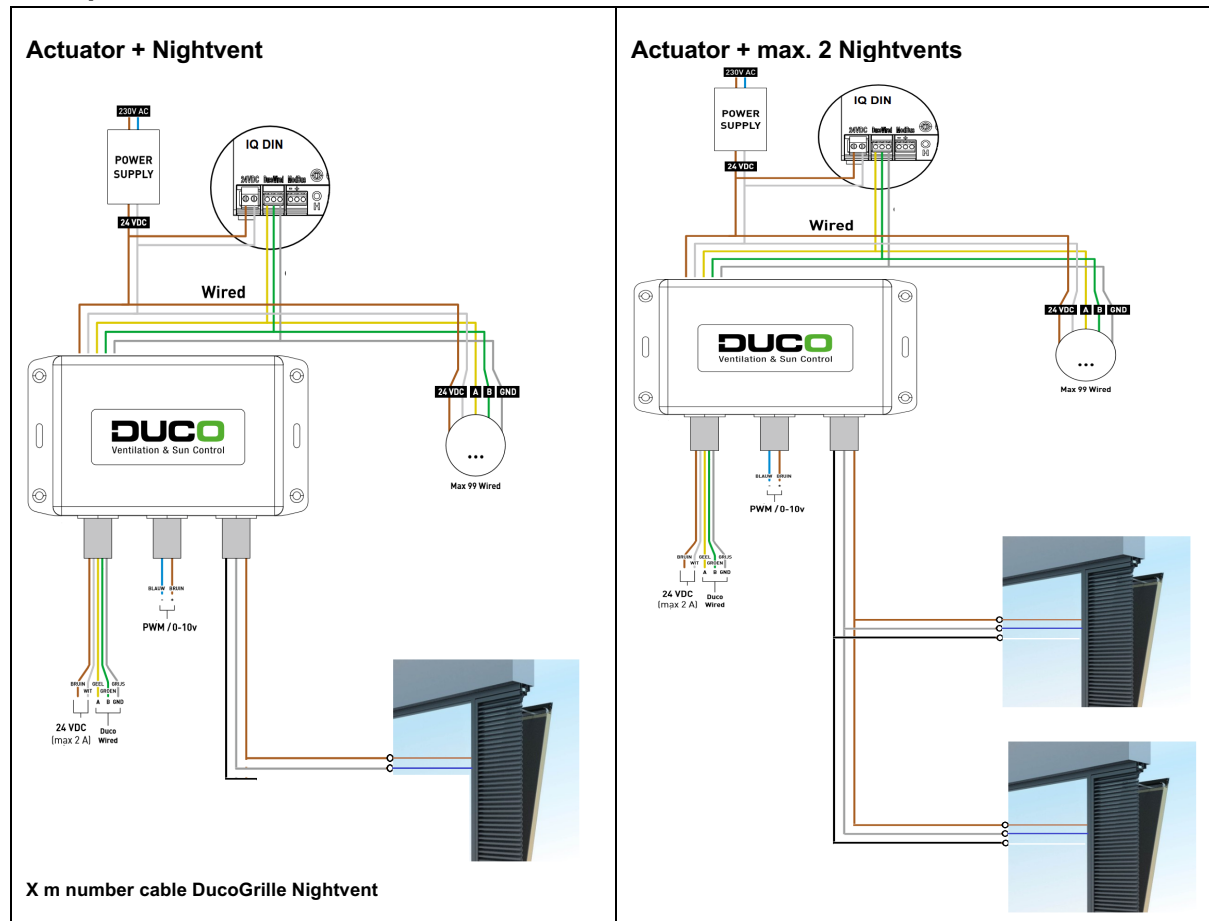
Electric specifications

Communication	Wired
Power supply	24 VDC
Connections	2- or 3-point control (3 cores) PWM out (2 cores) Duco Wired (5 conductors)
Power	1.2 W (+ capacity of the actuator motor)
Actuator motor power supply	24 VDC/max. 2 A
Reverse polarity protection	Graetz bridge

Nightvent motor

TECHNICAL DATA			
U_N	Rated voltage	24V DC ($\pm 20\%$), max. 2 Vpp	
I_N	Rated current	0,7 A	
I_A	Cut-off current	1,0 A	
P_N	Rated power	17 W	

Example:



Electric specifications

DucoGrille Close motor features

Example: Ducogrille Close 105

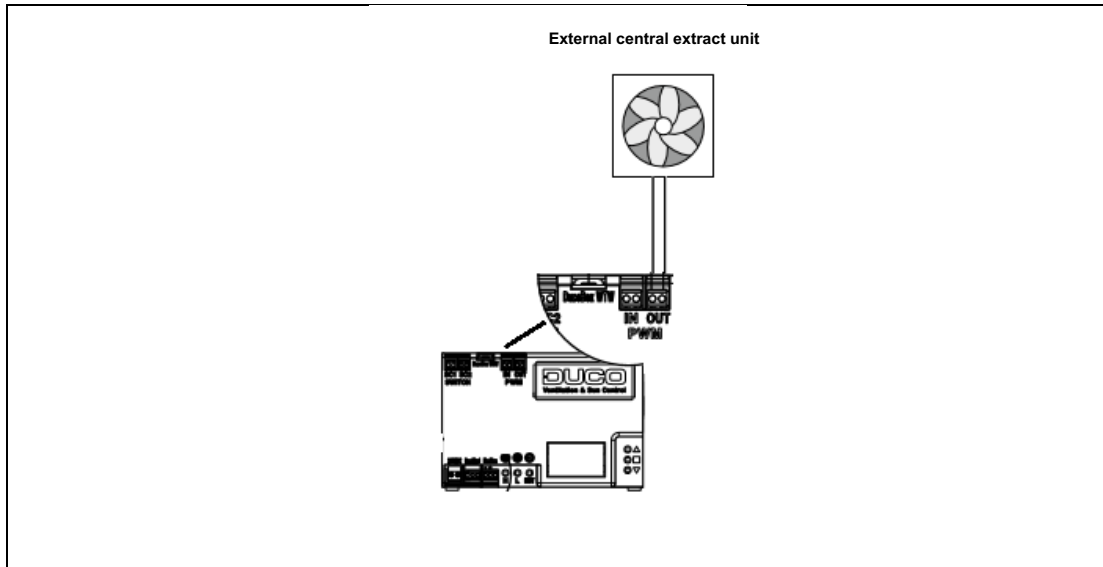


External components/controls

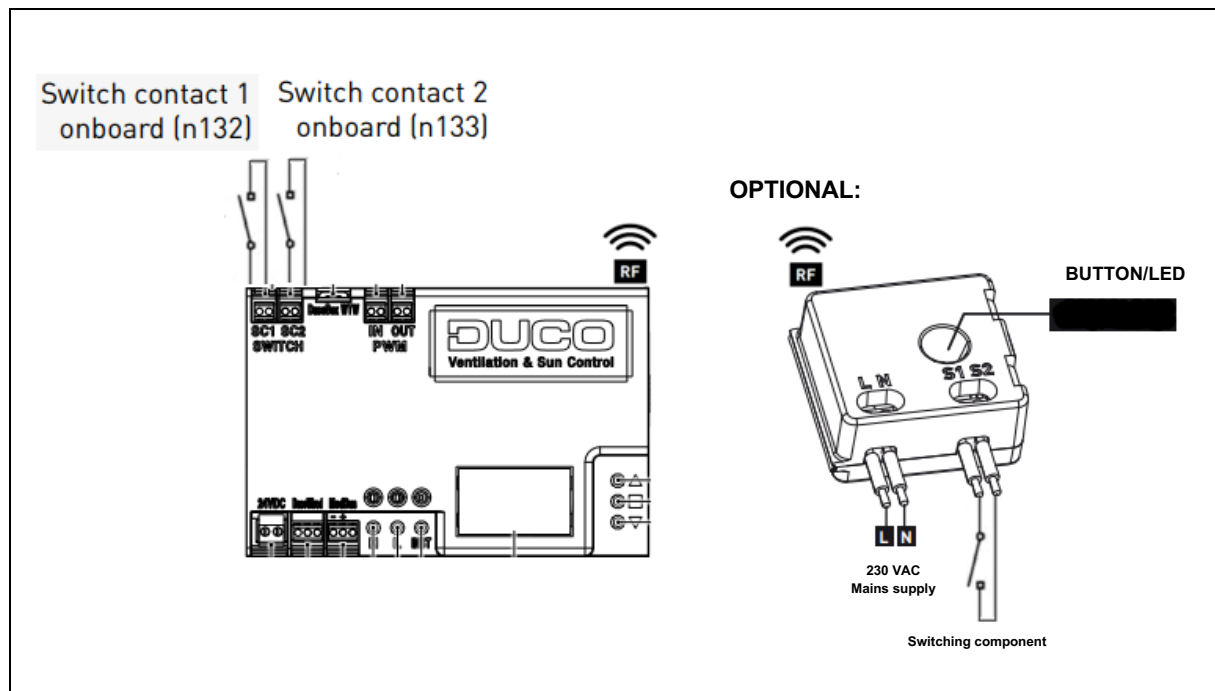
External central extract unit

2 x 0.8mm²

Maximum distance: 10 m, shielded connected to the earth or the Gnd



Switch sensors n132 / n133 / n.... (Alarm contact, fire contact, etc.)

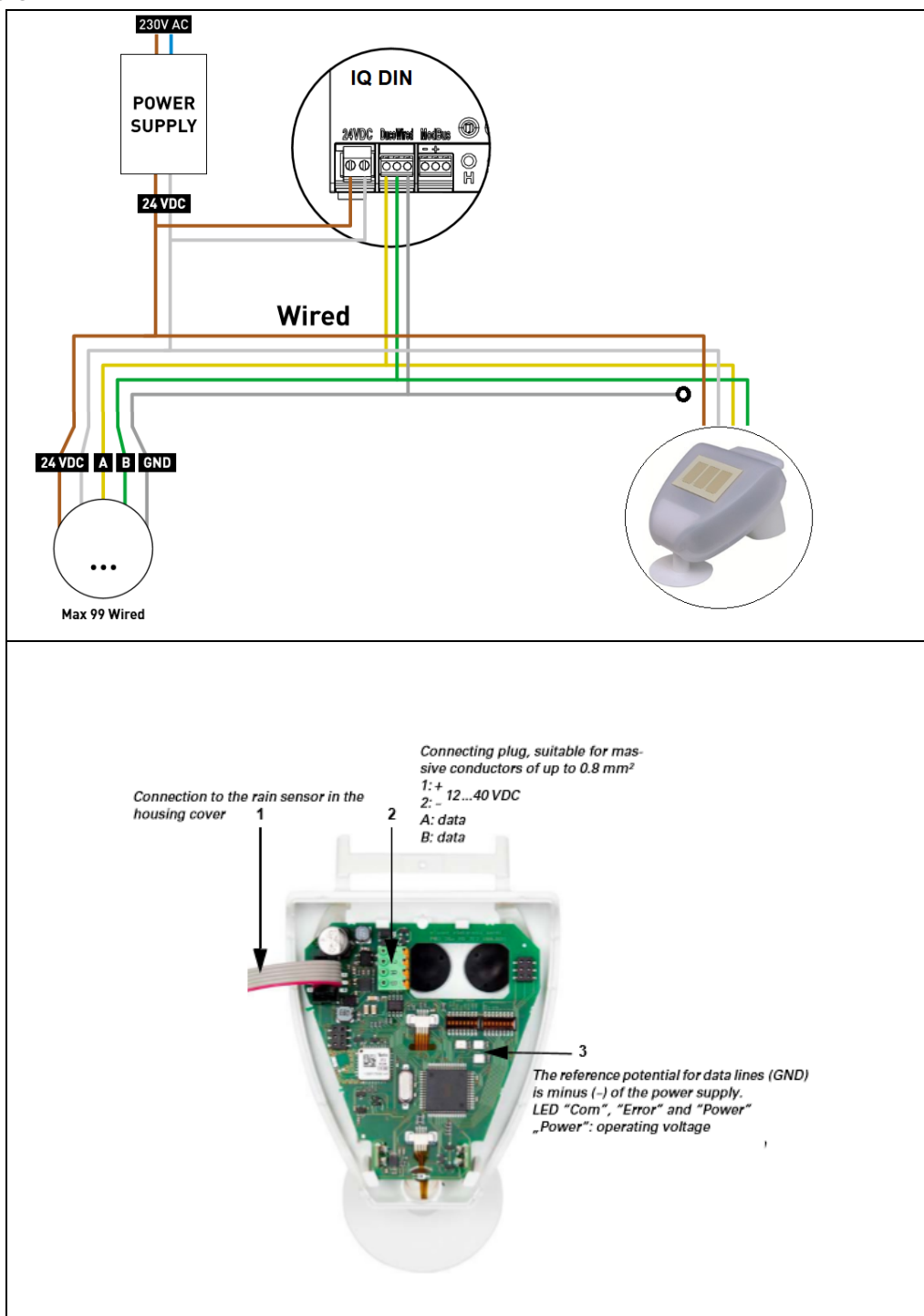


Duco Weather Station:

Electric specifications

Peak power	0.24 W
Power supply	24 VDC

Example:



Building management system (KNX)/Qbus

Qbus Modules:

CTD 01E: Mini controller with network port for Qbus Cloud

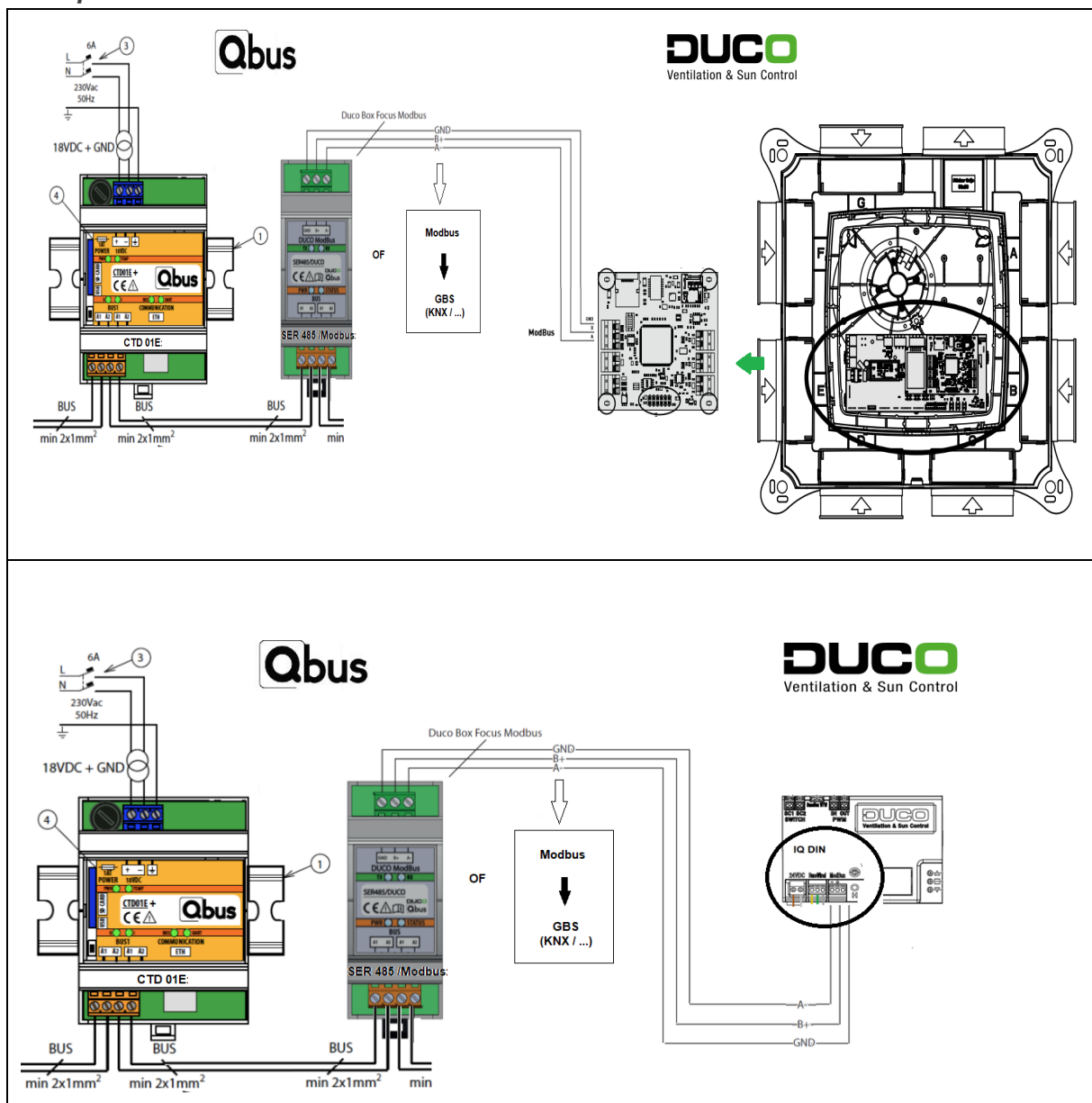
Qbus SER 485/Modbus: Modbus connection module

DUCO Masters

DucoBox Focus/DucoBox Silent Connect

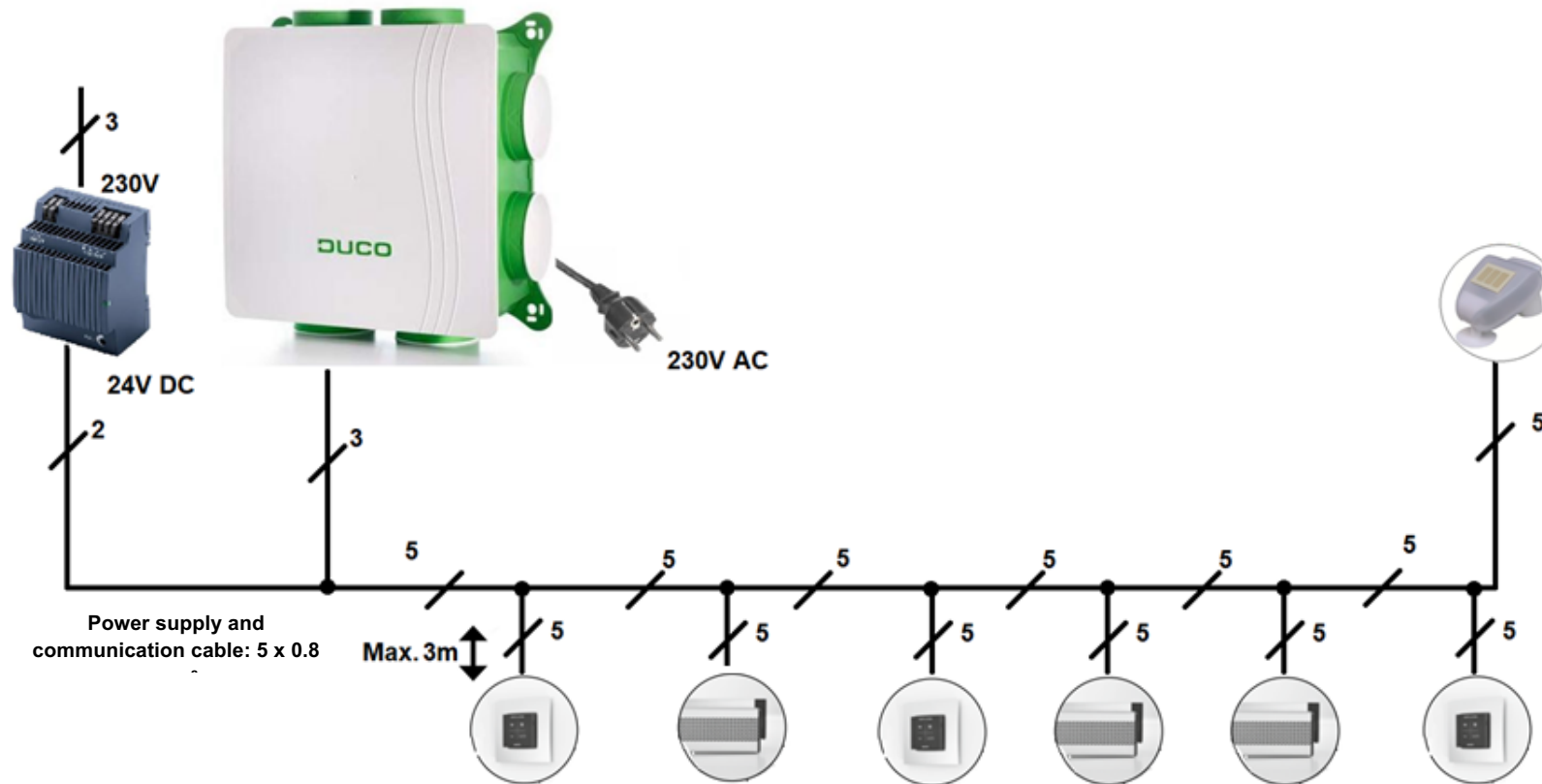
+ Communication Print

Example:

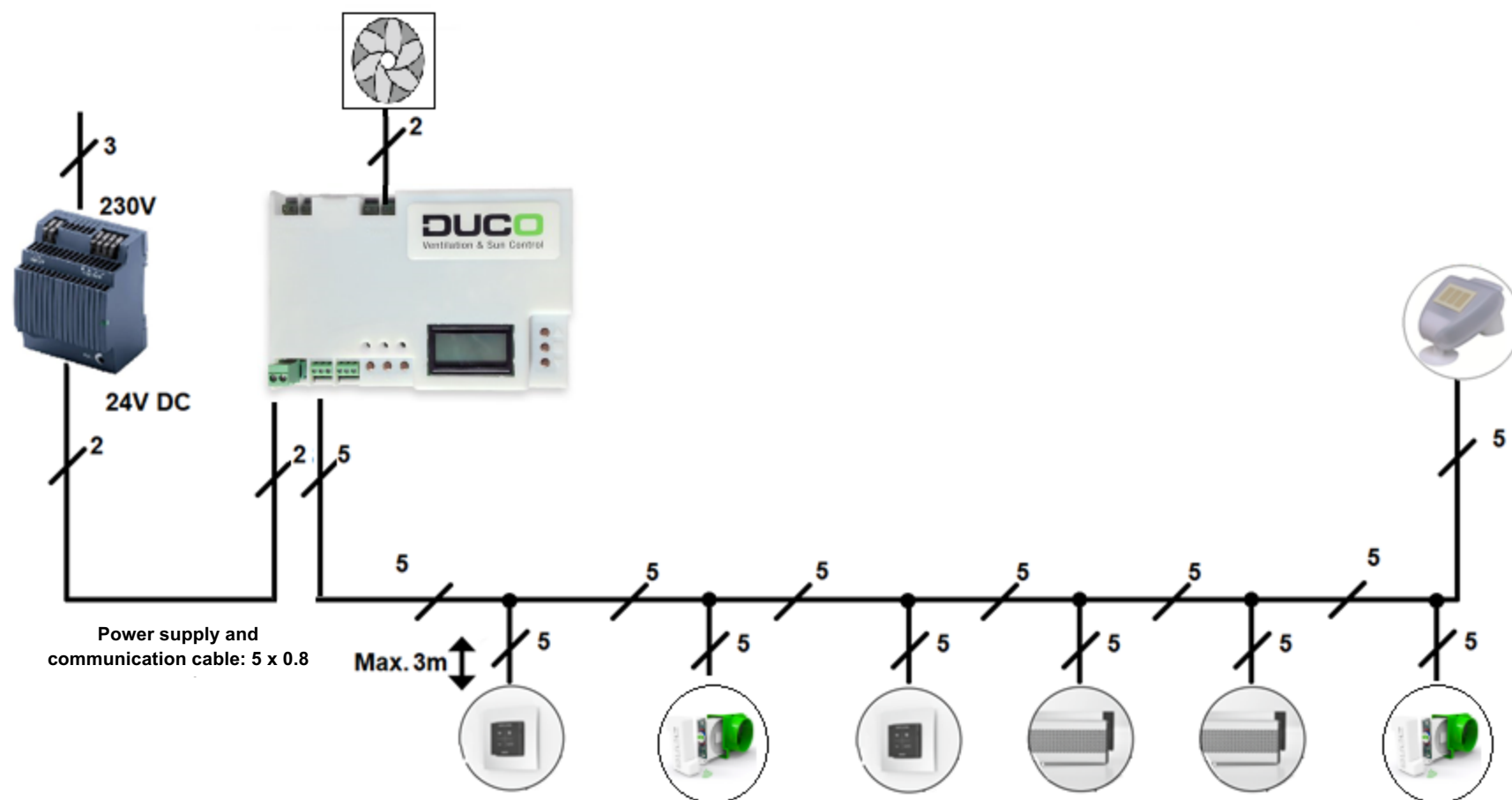


Wiring diagrams: Diagrams with Duco components:

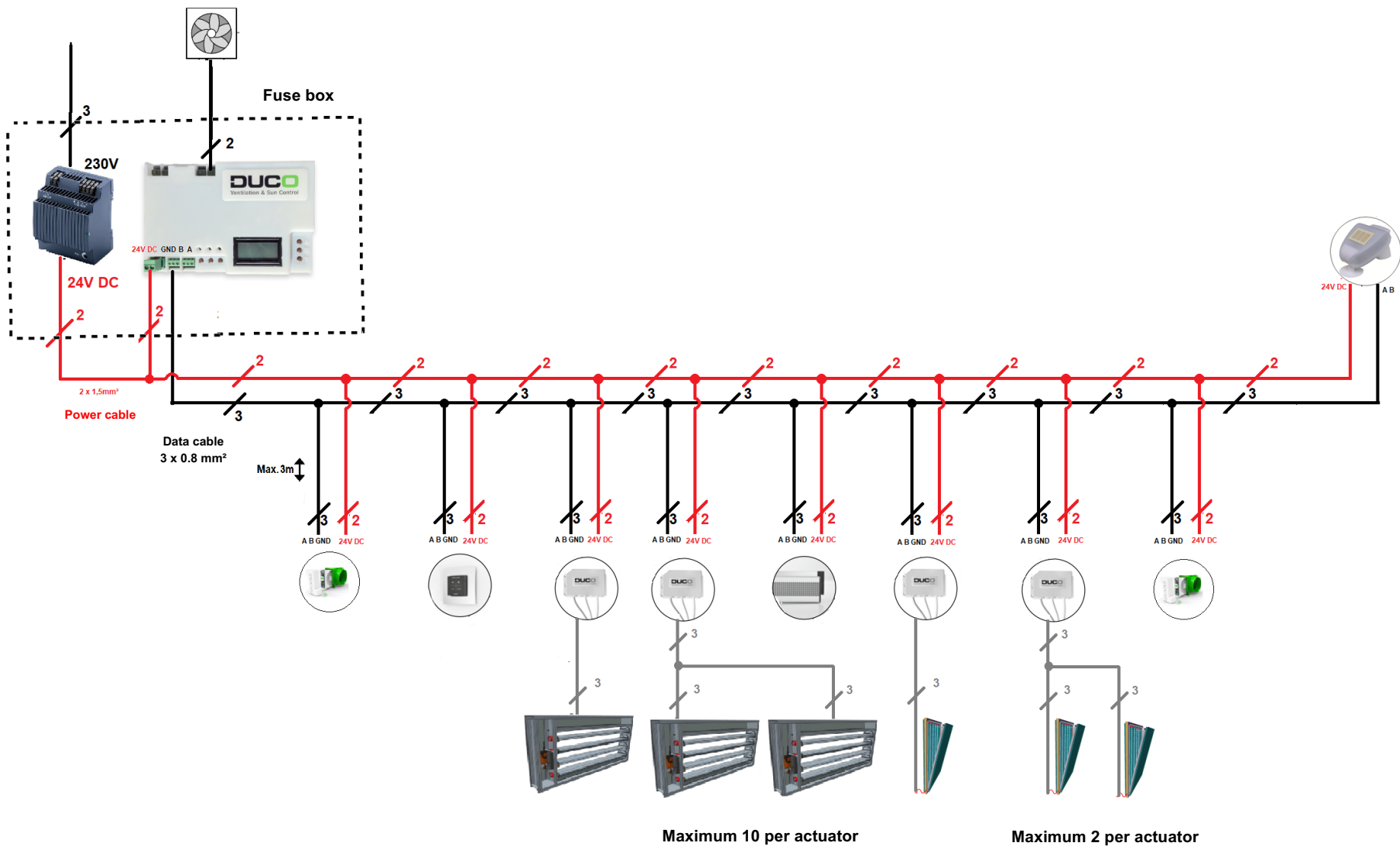
Housing construction: diagram:



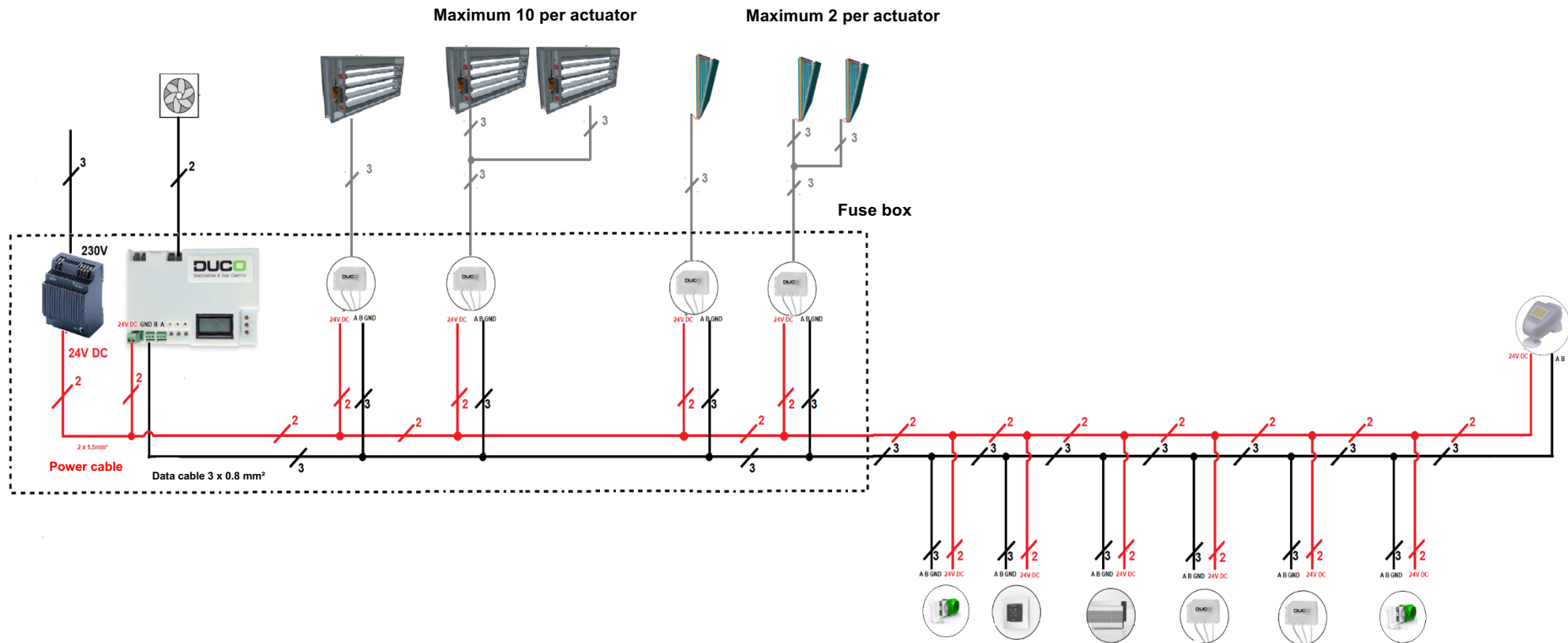
Small office:



Utility: wiring diagram with 1 central power supply where actuators belong to the DucoGrille Nightvents and DucoGrille Close 105



Utility: wiring diagram with 1 central power supply where actuators belong to the DucoGrille Nightvents and DucoGrille Close 105



Utility: wiring diagram with several power supplies with actuators belonging to the DucoGrille Nightvents and DucoGrille Close 105

