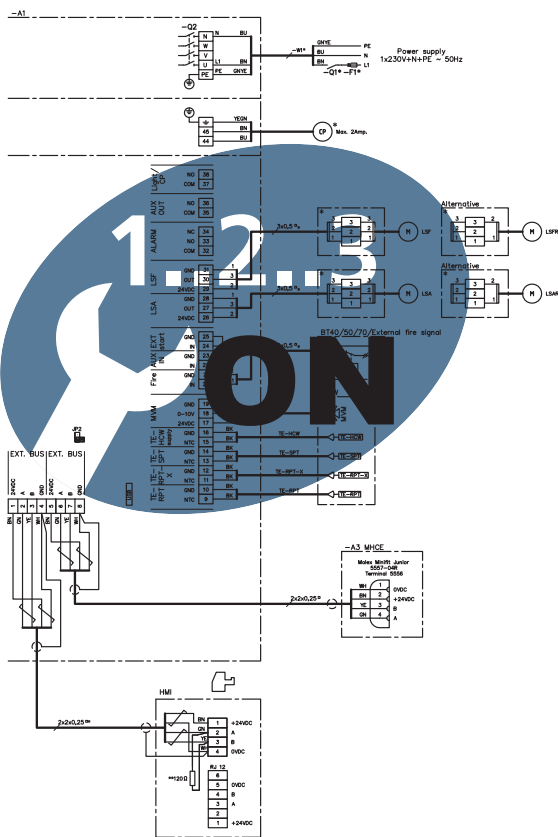


GB

Guide to Electrical Installation of VEX150-160-170 with water heating coil and EXact2



VEX100
R A N G E
CROSS FLOW
HEAT EXCHANGER



3004519-2014-08-27-01

⚡ Electrical installation.....Chapter 1 + 2

Original instructions



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Symbols, terms and warnings

Prohibition symbol



Failure to observe instructions marked with a prohibition symbol may result in serious or fatal injury.

Danger symbol



Failure to observe instructions marked with a danger symbol may result in personal injury and/or damage to the unit.

Scope

These instructions apply to the EXHAUSTO EXact2 control system. Please refer to the product instructions regarding accessories and extra equipment.

The instructions must be fully observed to ensure personal safety and to protect the equipment and ensure its correct operation. EXHAUSTO A/S accepts no liability for accidents caused by equipment not used in accordance with the manual's instructions and recommendations.

Warnings



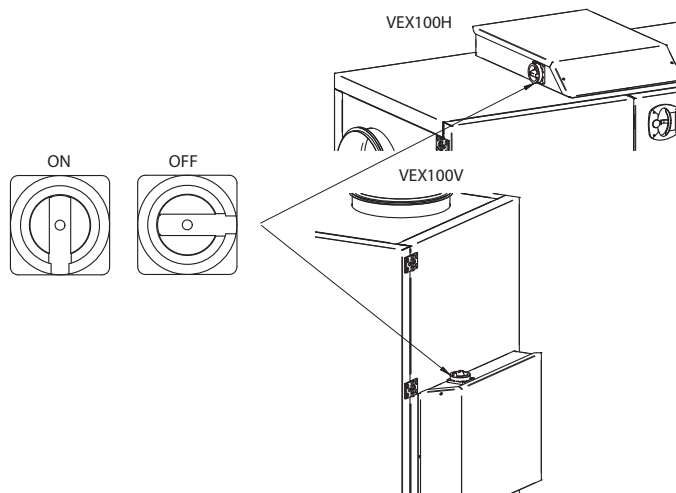
The work must be performed by an authorised electrician, in accordance with locally applicable regulations and legislation.

Warnings

Opening the unit



Do not open the service doors until the supply voltage has been disconnected at the isolation switch and the fans have stopped.



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No duct connection



If one or more of the spigots is not connected to a duct: fit a protective net to the spigots with a maximum mesh width of 20 mm.

Rating plate

The VEX unit rating plate shows:

- VEX unit, type (1)
- production number (2)

EXHAUSTO A/S <small>Oslovej 10 • 2000 Frederiksberg • Danmark Tlf: +45 8658 1110 • Fax: +45 8658 1234</small>		CE	
Type	V150HLECW2	← I _{lev} = 10kA	1
	No./Year 1234567/13	←	2
Supply	Voltage: 3x400V+N+PE ~50Hz	Current: 15A	
HEAT	HCW		

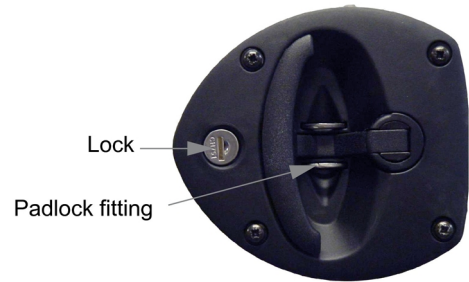
NB

Always have the production number ready when contacting EXHAUSTO A/S.

Lock the air handling unit during operation

The VEX unit must always be locked during operation:

- Use the cylinder lock in the handle. **Remember** to remove the key from the lock.
- Or use a padlock. Use the handle's built-in padlock fixture





1. Connection diagram for supply voltage and connection box

1.1 Connection diagram

Diagram

The diagram on the following page illustrates the connection of the power supply, HMI display panel and various accessories that can be connected at the connection box.

Key to diagram on the following page

Designation	Description	Supplied by
-A1	Connection box	EXHAUSTO
-A2	MCCW, MXCU	EXHAUSTO
-F1	Distribution board fuses	Customer
-F2	Connection box control fuses	EXHAUSTO
-Q1	Distribution board group switch	Customer
-Q2	Connection box isolation switch	EXHAUSTO

Further info

See also section "EXact2 main board" section for more information on components which can be connected.

NB

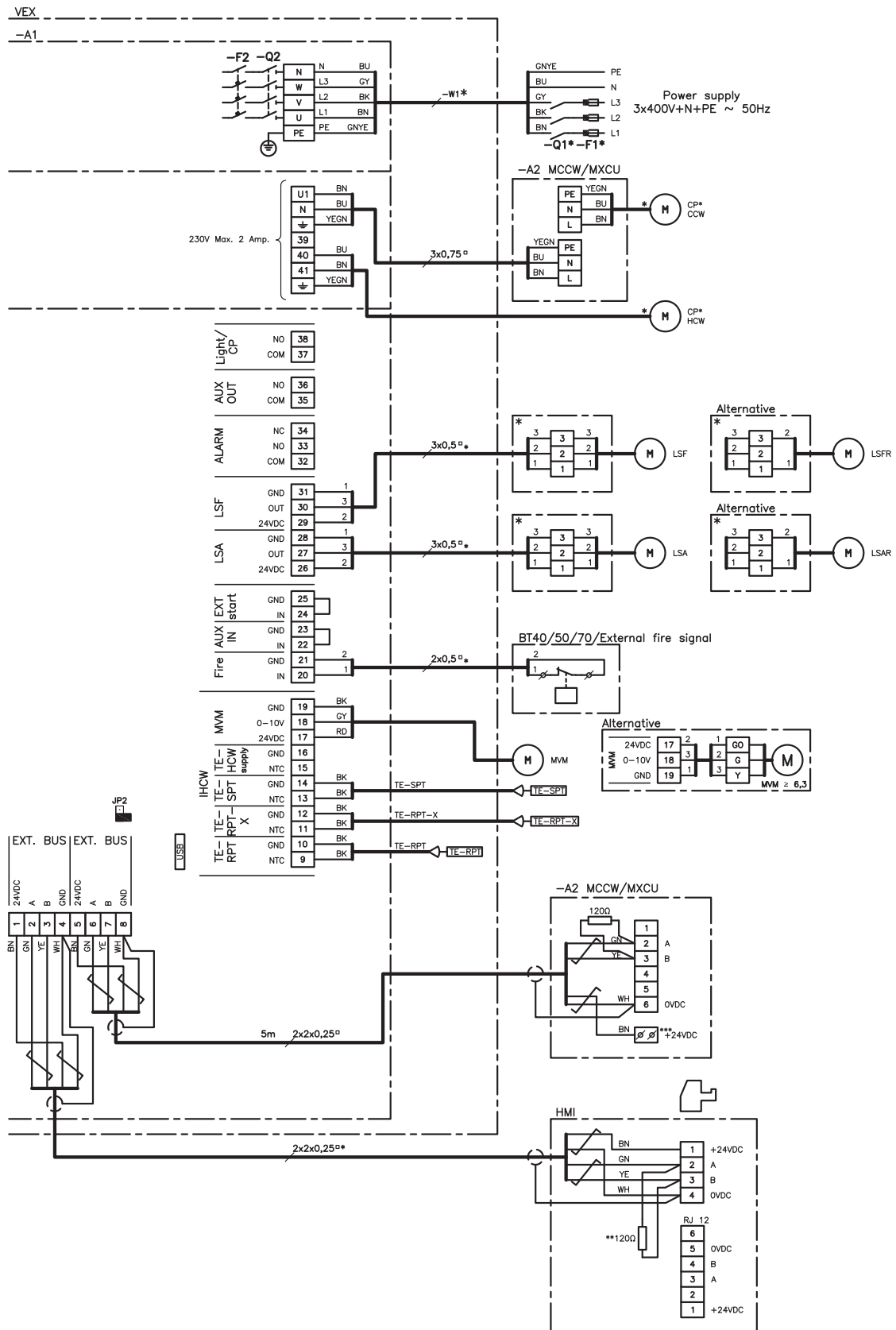
Other parts, shown on the front page of the VEX instructions, are supplied by EXHAUSTO

Accessories

See instructions for the relevant accessories:

- MXCU, module for external cooling unit
- CCW, cold water coil

1.1.1 Connection diagram for supply voltage and connection box



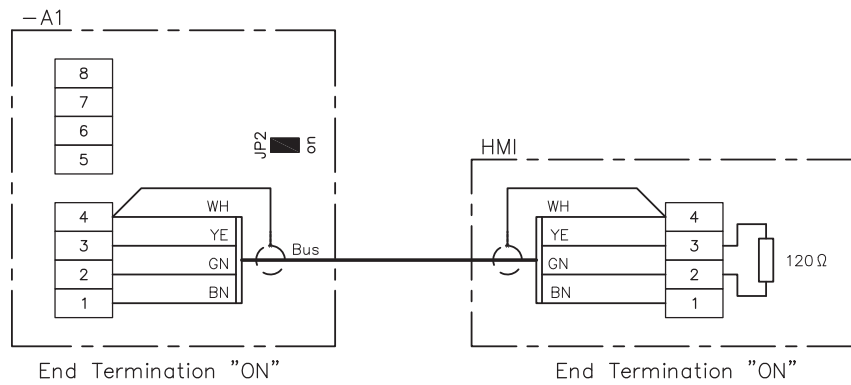
* Not supplied by EXHAUSTO
 ** 120 Ω terminating resistor

1.1.2 Termination

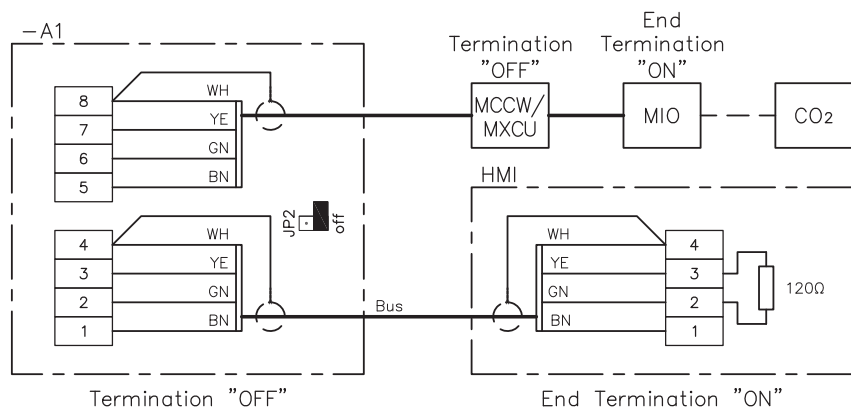
The first and last devices on the bus must be terminated. The diagrams below show two termination examples. See position of jumper JP2 on EXact2 Main Board in section "Terminal board on EXact2 Main Board".

If	Then	See diagram no.
HMI is the only device on the bus (bus connector optional)	the jumper must be connected to JP2, which applies a resistance of 120 Ω	1
both buses are used	the jumper must not be connected	2
the bus connectors are not used	the jumper must be connected to JP2 as per diagram 1, which applies a 120 Ω resistance	1

1.

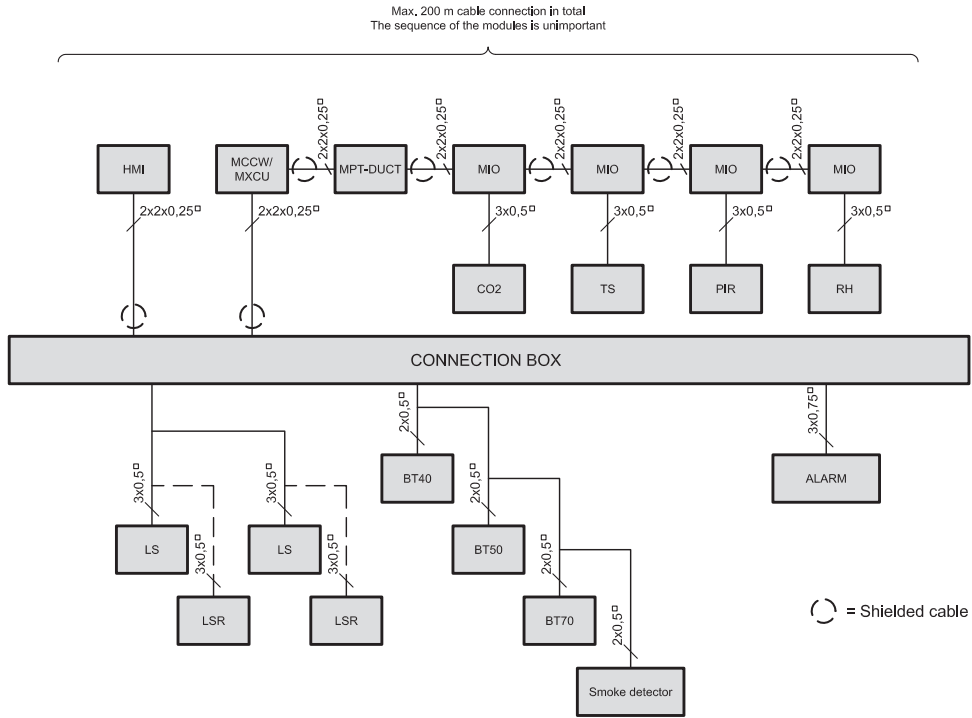


2.



1.2 Cable plan

The cable plan below shows the accessories that can be connected in the connection box.



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2. Installation of the VEX

2.1 Scope of installation

VEX unit The electrical installation for the VEX unit comprises the following connections:

Connection to VEX unit:

- Connection box
- MXCU module for external cooling coil (if any)
- CCW cold water coil (if any)

2.1.1 Connections in the connection box

Wiring configurations Wiring configurations for the terminal board in the connection box are shown in the table below.

Wiring configurations	See section
Supply voltage	2.2
HMI control panel via modbus	1
MODBUS components, via MODBUS	1 on termination and instructions for the component in question
Control for external MXCU cooling unit	1 on termination and instructions for the MXCU module
Control for cold water coil MCCW	in the cold water coil CCW instructions
External start*	below
Circulation pump	1
Closing damper, exhaust air LSA/LSAR	1
Outdoor air closing damper LSF/LSFR	1
Fire and AUX IN*	1 and below

* **External start, Fire and AUX IN**

Note following jumper settings for EXact2 main board

If	Then
Fire is used	remove the jumper between terminals 20 and 21
AUX IN is used	remove the jumper between terminals 22 and 23
EXT start is used	remove the jumper between terminals 24 and 25

2.2 Dimensioning and electrical installation



- The supply cable must be dimensioned and installed in accordance with applicable rules and regulations.
- The earth terminal (PE) must always be connected.

Diagram The supply voltage must be connected to the isolation switch as shown in the diagram in section 1.

2.2.1 Installation requirements and recommendations

Isolation switch and control fuses An isolation switch and control fuses have been integrated in the unit. The control fuses protect internal electrical components from overload and short-circuiting. The section "Control fuses" indicates the number and size of integrated control fuses.

Fuses The fuses must be suitable for:

- Short-circuit protection of the unit
- Short-circuit protection of the supply cable
- Overload protection of the supply cable

Max. rating Maximum fuse rating is 63 A (gG/gL).

Power supply cable When dimensioning the supply cable, the conditions at the installation location, including temperature and cable duct layout, must be taken into consideration.

Earth leak circuit breaker



- The unit must be protected against indirect contact.

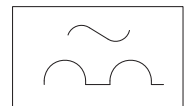
If current earth leak circuit breakers are fitted in the installation, they must be of a type that meets the following requirements:

VEX150-160:



PFI type A breaker that breaks the circuit on registering a vagrant current with DC content (pulsating DC) in accordance with EN 61008.

The circuit breakers must be marked with the following symbol:

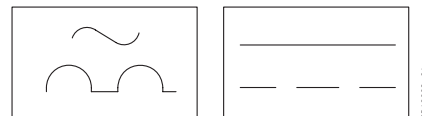


VEX170:



PFI type B breaker that breaks the circuit on registering a vagrant current with DC content (pulsating DC) or smooth vagrant current in accordance with EN 61008.

The circuit breakers must be marked with the following symbol:



- Cutout time must be max. 0.3 s.

Current leakage

A leak current of up to 100 mA can be generated.

2.2.2 Electrical connections

VEX type	Voltage[V]	Dimensioned power consumption [A] (max. phase current)	Max. neutral current [A]
VEX150H/150V	3 x 400 V+ N+ PE ~ 50Hz	8,7	15
VEX160H/160V	3 x 400 V+ N+ PE ~ 50Hz	15,5	23,5
VEX170	3 x 400 V+ N+ PE ~ 50Hz	17,5	

NB Maximum phase current is the dimensioned current for choice of cable. Cable should be dimensioned according to maximum neutral current if this is greater than the maximum phase current.

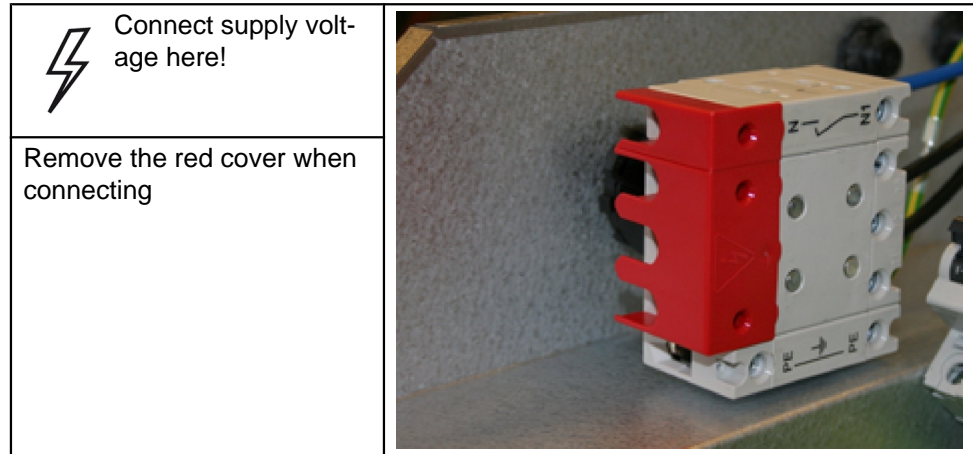
Short-circuit current Maximum short circuit current (I_{cu}), in accordance with EN60947.2 is 10 kA.

Accessories Accessory types CCW and XCU do not require separate supply cables and can be directly connected to the VEX control system box.

Terminals (U1, N) ...may only be used with the above mentioned accessories, and can have a 2.0 A maximum load. A maximum of one CCW/XCU (cooling) can be connected. The EXact2 control system prevents both heating and cooling operating at the same time.

Circulation pump The circulation pump can be connected to AHUC. The circulation pump may not draw more than 2.0 A, and its cable must be dimensioned for a 10 A fuse.

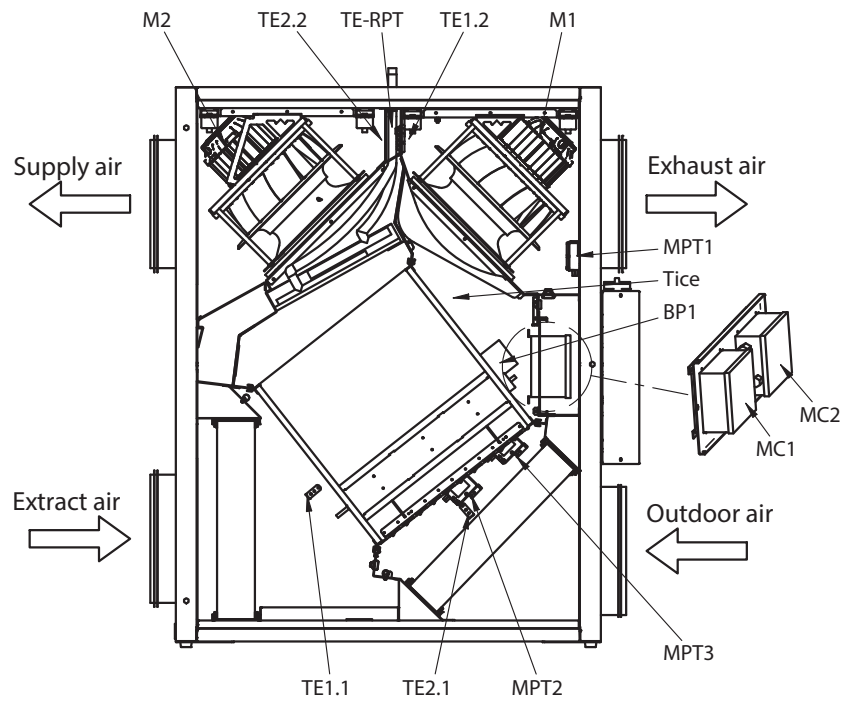
Isolation switch, inside



2.3 Electrical components

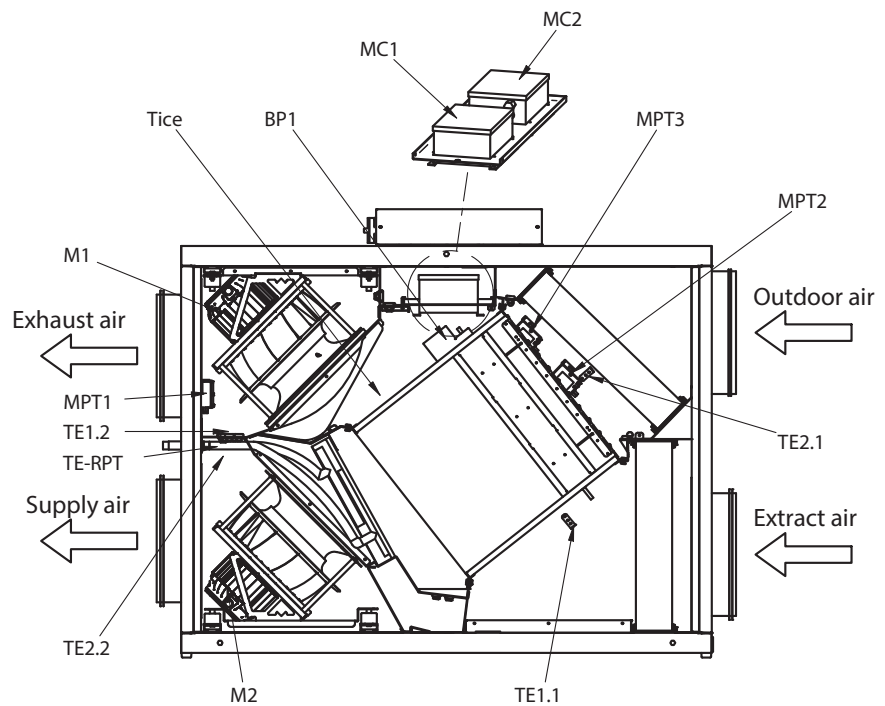
Positioning of electrical components The drawings below show the location of bypass damper motor, motor control, temperature sensors and other components.

VEX150-160VL



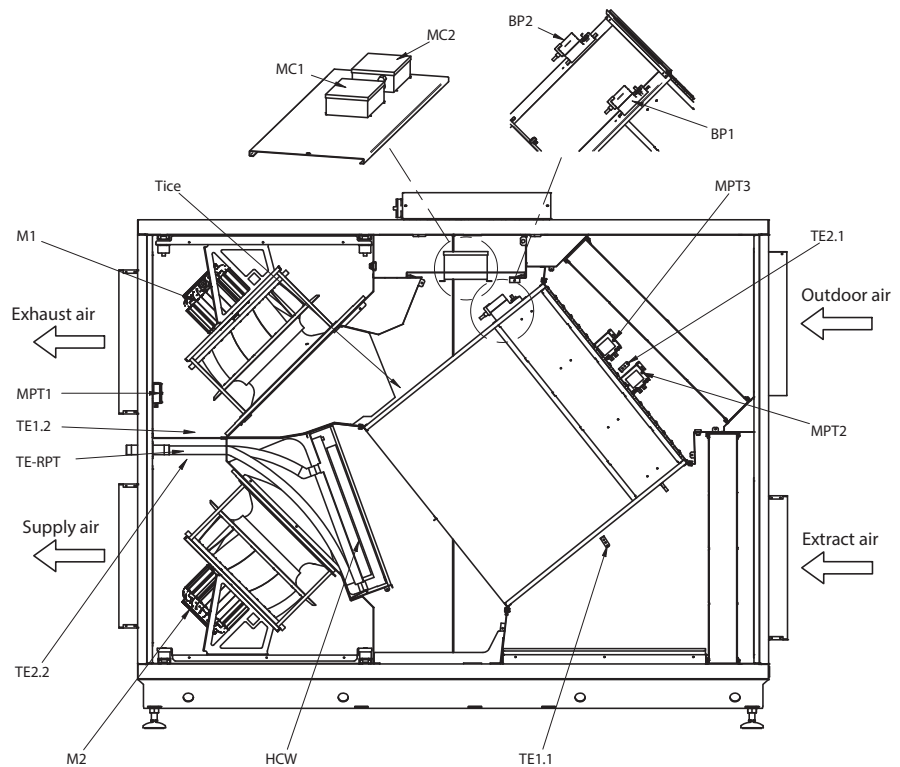
RD13422GB-01

VEX150-160HL



RD13420GB-01

VEX170HL



RD13426GB-01

Component	Description
M1	Extract air motor
M2	Supply air motor
BP1	Bypass damper motor 1
BP2	Bypass damper motor 2 (VEX170 only)
MC1	Motor control, extract air/exhaust air motor
MC2	Motor control, outdoor air/supply air motor
MPT1	AFC (airflow control)
MPT2	MPTF (pressure drop across filter)
MPT3	DEP (Ice detection in case of pressure drop across counterflow heat exchanger)
TE1.1	Temperature sensor, extract air
TE1.2	Temperature sensor, exhaust air
TE2.1	Temperature sensor, outdoor air
TE2.2	Supply air temperature sensor
TE-RPT	Temperature sensor in return pipe from water heating coil (internal)
Tice	Temperature sensor for ice in exchanger

2.3.1 Control fuses integrated in VEX 150-160-170 with water heating coil

VEX size	Voltage[V]	Fuse for control system (1x230V) 2 pole	Fuse for MC1 (1x230V) 2 pole	Fuse for MC2 (1x230V) 2 pole
VEX150	3 x 400 V+N+PE	C-10A	C-10A	C-10A
VEX160	3 x 400 V+N+PE	C-10A	C-16A	C-16A
VEX170	3 x 400 V+N+PE	C-10A		

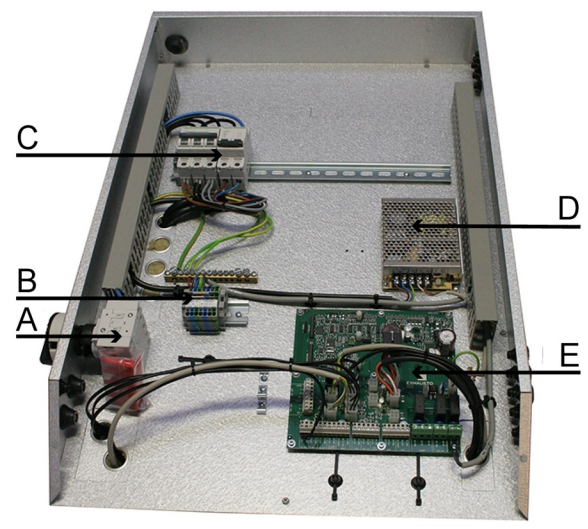
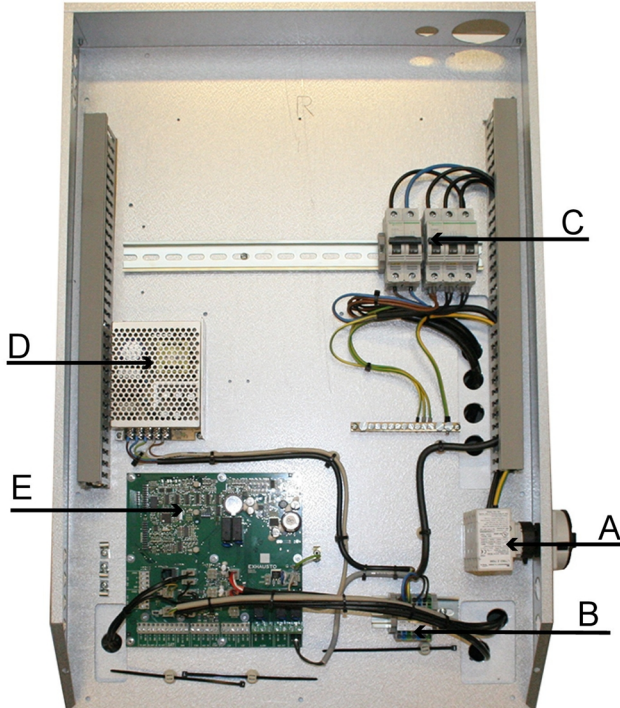
VEX size	Voltage[V]	Common fuse for MC1 and MC2 (3x400V) 3 pole	Total number of fuses
VEX150	3 x 400 V+N+PE		3
VEX160	3 x 400 V+N+PE		3
VEX170	3 x 400 V+N+PE	C-20A	2

2.3.2 Components in the connection box

VEX150-160

LEFT	<p>A photograph showing the left side of the connection box interior. Labels A, B, C, D, and E point to the isolation switch, terminal row, control fuses, power supply, and EXact2 main board respectively.</p>
RIGHT	<p>A photograph showing the right side of the connection box interior. Labels A, B, C, D, and E point to the isolation switch, terminal row, control fuses, power supply, and EXact2 main board respectively.</p>
Pos.	Component
A	Isolation switch
B	Terminal row
C	Control fuses
D	Power Supply
E	EXact2 main board

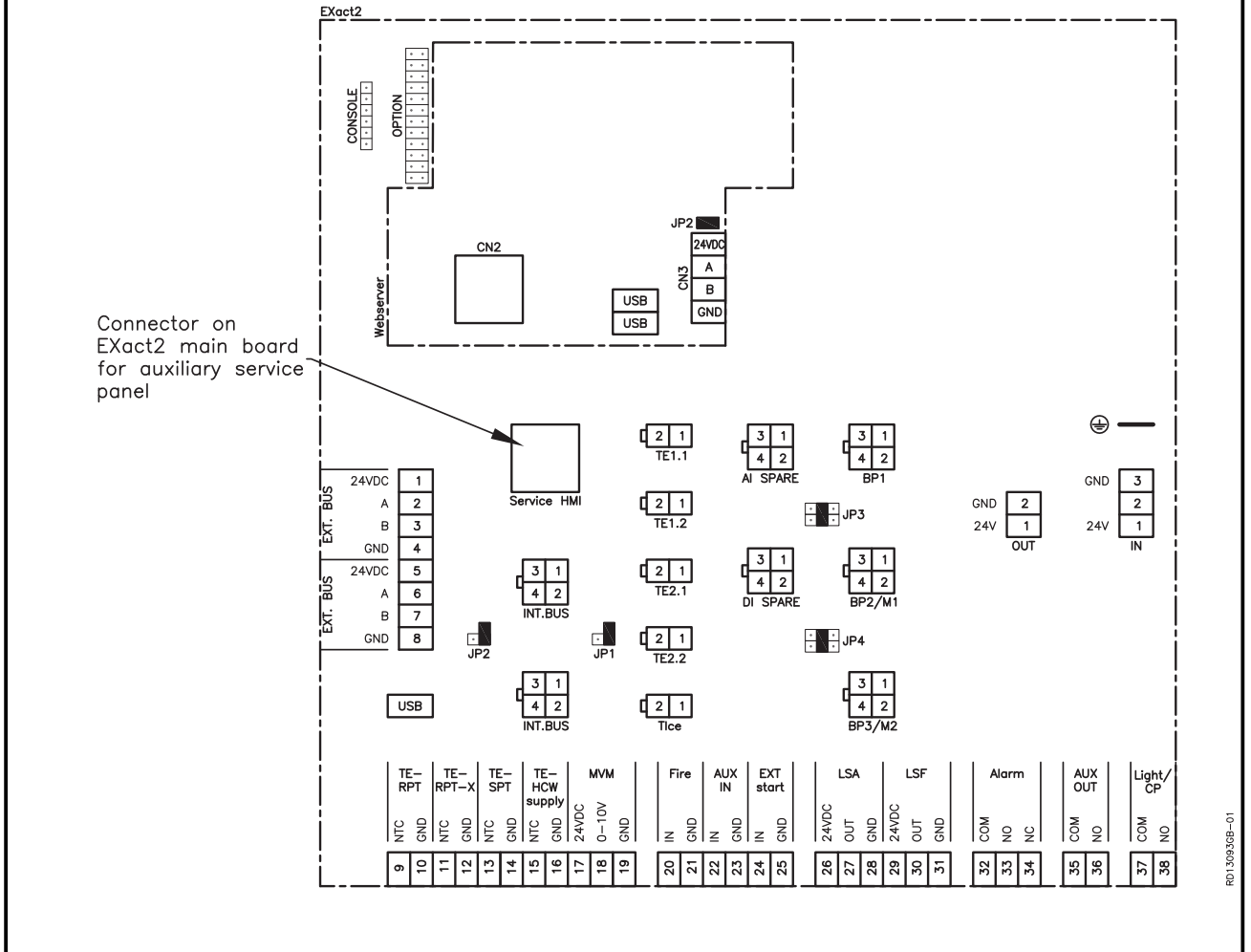
VEX170

LEFT	
RIGHT	
Pos.	Component
A	Isolation switch
B	Terminal row
C	Control fuses
D	Power Supply
E	EXact2 main board

2.4 EXact2 main board

2.4.1 Terminal board on EXact2 main board

The layout drawing below gives an overview of components (standard + accessory) that can be connected to the terminal blocks.



Component	Terminal board connection	Description
BUS	1 - 4	Bus for external parts
BUS	5 - 8	Bus for external parts
TE... + MVM	9 - 19	Taken together, these terminals constitute IHCW, which is used for controlling the HCW coil.
Fire	20 - 21	BT40, BT50, BT70 Smoke detector or other fire detection switch
AUX IN	22 - 23	Same function as Fire
EXT start	24 - 25	If this is closed, the unit will start up If this is broken, the unit will stop
LSA	26 - 28	LS, exhaust air closing damper LSAR, exhaust air closing damper with spring return
LSF	29 - 31	LS, outdoor air closing damper LSFR, outdoor air closing damper with spring return
Alarm	32 - 34	General alarm
AUX OUT	35 - 36	Reserved for future use

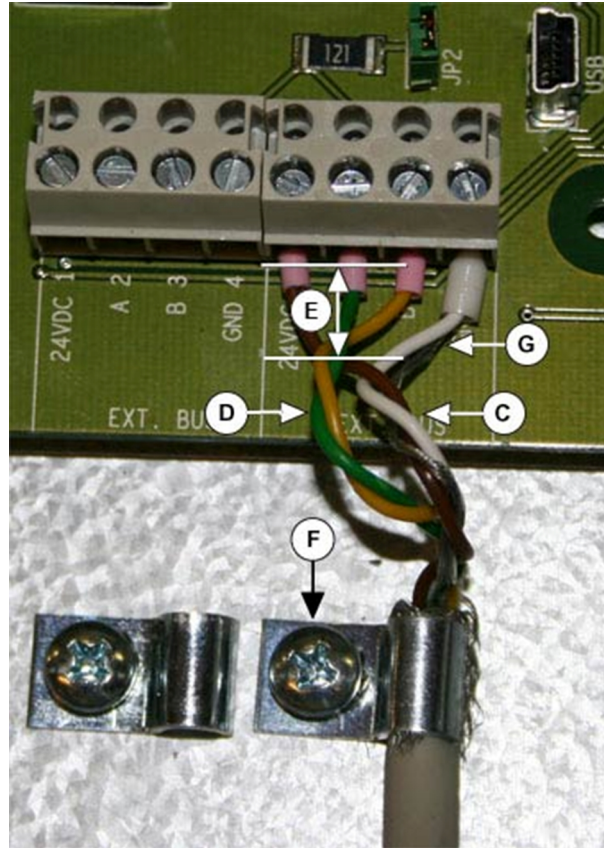
Component	Terminal board connection	Description
Light/CP	37 - 38	Circulation pump
USB	USB	For service use
DI SPARE		TIMERBUTTON2/TIMERBUTTON2
AI SPARE		CO2/RH
OUT		24 V supply for MLON/MTCP
Service HMI	Service HMI	Plug for connecting extra HMI panel, see section "Servicing - connection of extra HMI control panel".
Jumper		
JP1		Option for termination, internal BUS
JP2		Termination option, external BUS, see section 1
JP3	BP2/M1	Configuration BP2/M1. Set at the factory.
JP4	BP3/M2	Configuration BP3/M2. Set at the factory.
Web server (accessory)		
Web server	CN2	Ethernet
Web server	CN3:	Connection of BMS
Web server	JP2	To be terminated if BMS is connected to CN3 (shown as ON).

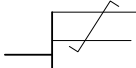
2.4.2 Connecting shielded cable to MODBUS

Cable type MODBUS requires shielded cable of type 2 x 2 x 0.25 [□] twinned pair conductors.

Connection

Wires and screen must be connected as shown in the table below



Wire	Step	Action	See
Wires Symbol: Twisted pair 	1	Carefully strip the wires - as little as possible and ensure they do not become damaged/broken	
	2	Twist 0 V and 24 V wires together as a twisted pair	C
	3	Twist A and B wires together as twisted pair	D
			The wires must be twisted together as close to the terminal as possible - max. distance from the terminal: 1.5 cm.
Screen	1	Strip the screen before the cable clamp (F)	
	2	Fit clamp so that it surrounds the screen and secures the cable	F
	3	Take some of the cable shield and run it into the terminal 0 V connection with the 0 V wire	G

2.4.3 Service – connection of additional HMI control panel

An additional HMI control panel connected during servicing overrides the HMI panel connected to the unit. Refer to the EXact basic instructions for further information.



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