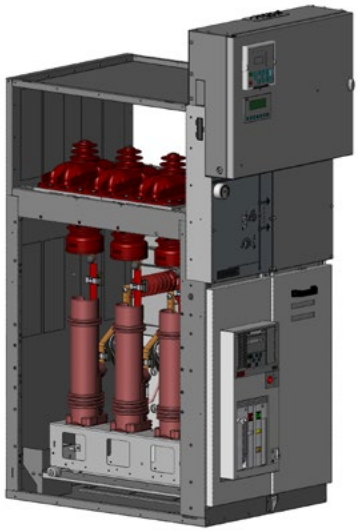
DISTRIBUTION SOLUTIONS

UniSec Digital

Operation and maintenance manual



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Safety

Warnings provided in the interest of safety

- Strictly comply with the instructions provided in this manual.
- The apparatus must only be installed indoors, in conditions suitable for electrical equipment.
- Make sure that the installation, use and maintenance operations are performed by qualified personnel only.
- Fully comply with the applicable rules of law (IEC or local), the connection conditions required by the local utility companies and the pertinent occupational safety provisions.
- All work on the apparatus must be performed in accordance with the corresponding instructions in the manual.
- Consult the relevant manual for instructions on how to use the circuit-breaker.
- Consult the relevant manual for instructions on how to use the concentrator.

Qualified personnel

All installation, commissioning, operation and maintenance work must be performed by qualified personnel with adequate knowledge of the apparatus.
During maintenance work, strictly comply with the regulations in force in the country in which the apparatus is installed.
Maintenance operations must be performed to the highest standards of workmanship by trained personnel who are fully familiar with the characteristics of the apparatus, in compliance with all the pertinent IEC safety regulations, the regulations provided for by other technical bodies and further instructions of primary importance. You are strongly advised to engage the services of ABB assistance personnel for maintenance and repair work.

Information of crucial importance

Pay particular attention to information in the manual highlighted by the following symbol:

This symbol is followed by four different indications signalling the sort of injuries or damage which could occur due to failure to comply with the instructions, including those concerning safety precautions

- **DANGER - highlights the more serious and immediate risks able to cause severe personal injuries and death**
- **WARNING - indicates risks or unsafe actions which could cause severe personal injuries or death.**
- **CAUTION - indicates risks or unsafe actions which could cause less severe personal injuries or material damage**
- **NOTE - highlights important procedures or requirements which, in the case of non compliance, could result in material damage**

WARNING
Make sure that the specified electrical data are not exceeded in the conditions is which the apparatus is used. Keep the manuals in an accessible place where they can be consulted by all the personnel involved in the apparatus installation, use and maintenance operations. The utility provider's personnel are responsible for all issues concerning occupational safety and correct use of the apparatus

WARNING
Always comply with the instructions in the manual and the regulations governing good engineering practice (GEP)! Dangerous voltages can cause severe injuries or death. Disconnect the supply source, then earth all live parts before performing any work on the apparatus.
Comply with the safety regulations in force in the place of installation

NOTE
This manual is an addition to the operation and maintenance manual for UniSec panels 1VFM200005

Contacts

Please contact our area assistance center for any queries concerning this manual.
Consult the back cover of this manual for details about the contact people.

Introduction

General aspects

UniSec is an air-insulated switchgear for indoor use, designed for the secondary distribution of medium voltage. UniSec switchgear is the result of on-going innovation and the desire to meet the requirements of a constantly evolving market.
This new series of switchgears offers a broad range of technical solutions built to last over time.
Safety, reliability, ease of use, simple installation and environmental sustainability are the key features that guided the development of this switchgear.
UniSec assemblies are created by positioning standard units side by side in a coordinated way.
The switchgear is manufactured and tested in the production facility
.

Operation and maintenance manual

This manual contains instructions on how to replace the sensors in the UniSec Digital version and the main indications concerning the user interface.

Regulations and specifications

CEI EN/IEC standards	Title
IEC EN 62271-200	High voltage switchgear and controlgear Part 200: Metal-enclosed factory-built assemblies for rated voltages above 1 kV and up to and including 52 kV
IEC EN 62271-1	High voltage switchgear and controlgear Part 1: Common specifications
IEC EN 62271-202	High voltage switchgear and controlgear Part 202: Factory-built high/low voltage substations
IEC EN 61869-2	Instrument transformers Part 2: Additional requirements for current transformers
IEC EN 61869-3	Instrument transformers Part 3: Additional requirements for inductive voltage transformers
IEC EN 62271-100	High voltage switchgear and controlgear Part 100: Alternating current circuit-breakers
IEC EN 62271-102	High voltage switchgear and controlgear Part 102: Alternating current dirconnectors and earthing switches
IEC EN 62271-105	High voltage switchgear and controlgear Part 105: Switch-fuse combinations for rated voltages above 1 kV up to and including 52 kV
IEC EN 62271-103	High voltage switchgear and controlgear Part 103: Switches and switch-disconnectors for rated voltages above 1 kV up to and including 52 kV
CEI EN 60529	Protection classes of enclosures (IP code)
CEI EN 62271-206	High voltage switchgear and controlgear Part 206: Voltage presence indicating systems for rated voltages above 1 kV up to and including 52 kV
CEI EN 60071-2	Insulation co-ordination Part 2: Application guide
CEI EN 62271-106	High voltage switchgear and controlgear Part 106: Alternating current contactors, contactor-based controllers and motor-starters
IEC TS 62271-210:2013	High voltage switchgear and controlgear- Part 210: Seismic qualification for gas-insulated switchgear assemblies for rated voltages above 1 kV up to and including 52 kV
IEC TS 62271-304:2008	High voltage switchgear and controlgear- Part 304: Design classes for indoor enclosed switchgear and controlgear for rated voltages above 1 kV up to and including 52 kV to be used in severe climatic conditions

Table 1. Norme IEC

Introduction

Operating conditions

Normal operating conditions
The switchgear is designed for indoor use in normal operating conditions, as indicated in the respective IEC regulations (see table 1). Differences with respect to the normal operating conditions specified in the IEC standards (IEC 62271-1) must be defined separately with the manufacturer.

Ambient temperature	**° C**
Maximum value	+ 40
Max. mean value in 24 hours	+ 35
Min. mean value in 24 hours	- 5 (1)
Recommended minimum value	+ 5
Altitude above sea level	**m**
Maximum value	1000
Humidity conditions	**%**
Relative humidity mean value (24 hours)	≤ 95
Relative humidity mean value (1 month)	≤ 90
Pollution	
The ambient air must not be excessively polluted by dust, smoke, corrosive and/or inflammable gases, vapours or salinity	

(1) Consult ABB for –25°C operating temperatures and –40°C storage temperatures

Table 2. Operating conditions

Special operating conditions
The effects of the reduction in the dielectric strength of the insulating air must be considered at altitudes exceeding 1000 m (consult standard IEC 61271-1).IEC 61271-1 standards). Environmental temperature rises must be compensated when the busbars, branches and components are designed, otherwise the current carrying capacity will be limited.

DANGER

Condensation could form if the switchgear is in service where the humidity level is high and/or there are considerable temperature variations. However, the formation of condensation must be an exception to the rule in the normal operating conditions of indoor switchgear. Adequate preventive measures must be taken along with the manufacturer (e.g. installation of electric heaters) to prevent condensation from forming and, consequently, corrosion or other adverse effects. The operating system of the heaters depends on the relative design, while the specifications must be taken from the order documents

1. Technical data

1.1 Electrical Specifications

Rated voltage Ur	kV	12	17.5	24
Impulse withstand voltage Up	kV			
Common value		75	95	125
Between open contacts		85	110	145
Test voltage at power-frequency Ud	kV			
Common value		28	38	50
Between open contacts		32	45	60
Rated frequency	Hz	50/60	50/60	50/60
Rated current Ir	A			
Busbar		630/800/1250 (1) (4)	630/800/1250 (1)	630/1250 (1) (3)
Feeder		630/800/1250 (1) (4)	630/800/1250 (1)	630/1250 (1) (3)
Admissible rated short-time withstand current	kA			
Main circuit		16/20 (1)/25 (2)	16/20 (1)/25 (2)	16/20 (1)
Earthing circuit		16/20 (1)/25 (2)	16/20 (1)/25 (2)	16/20 (1)
Rated short-circuit duration	s	2/3	3	3
Rated peak current	kA	40/50/63	40/50/63	40 (3) /50 (1)
Protection degree (IP code)				
For enclosure		IP3X	IP3X	IP3X
For segregations		IP2X	IP2X	IP2X
For operating mechanism		IP3X	IP3X	IP3X
Mechanical strength of switch-disconnector	Cycles			
Closed/open		5000	5000	5000
Open/earthed		1000	1000	1000
SF_6 gas in switch-disconnector	Bar			
Rated filling pressure		1,4	1,4	1,4
Minimum operating pressure		1,3	1,3	1,3
Quantity of SF_6 gas	Kg	0,25	0,25	0,25

(1) Consult ABB for 21 kA/52.5 kAp
(2) For LSC2B classified units
(3) For Hysec 16 kA (1s) 40 kAp
(4) 25 kA 2s for LSC2A classified units

NOTE
Consult the manuals of the respective apparatuses for the specifications of any additional equipment, e.g. relays and circuit-breakers

1.2 Internal arc withstand classification

The internal arc withstand value is defined as follows:

Current	Accessible sides	Arcing time
12,5 kA	AFL	1 s
16 kA	AF	1 s
16 kA	AFLR	1 s
21 kA	AFLR	1 s
25 kA (1) (2)	AFLR	1 s

(1) Only for units with withdrawable circuit-breakers up to 17.5 kV
(2) Only LSC2A 750 mm H2000
Table 3. Internal arc withstand classification

NOTE
UniSec switchgear must be installed indoors, in conditions suitable for electrical equipment.
This means that access must be restricted to authorized personnel only

2. General information about UniSec Digital

The UniSec Digital monitoring system can be configured with the following components:

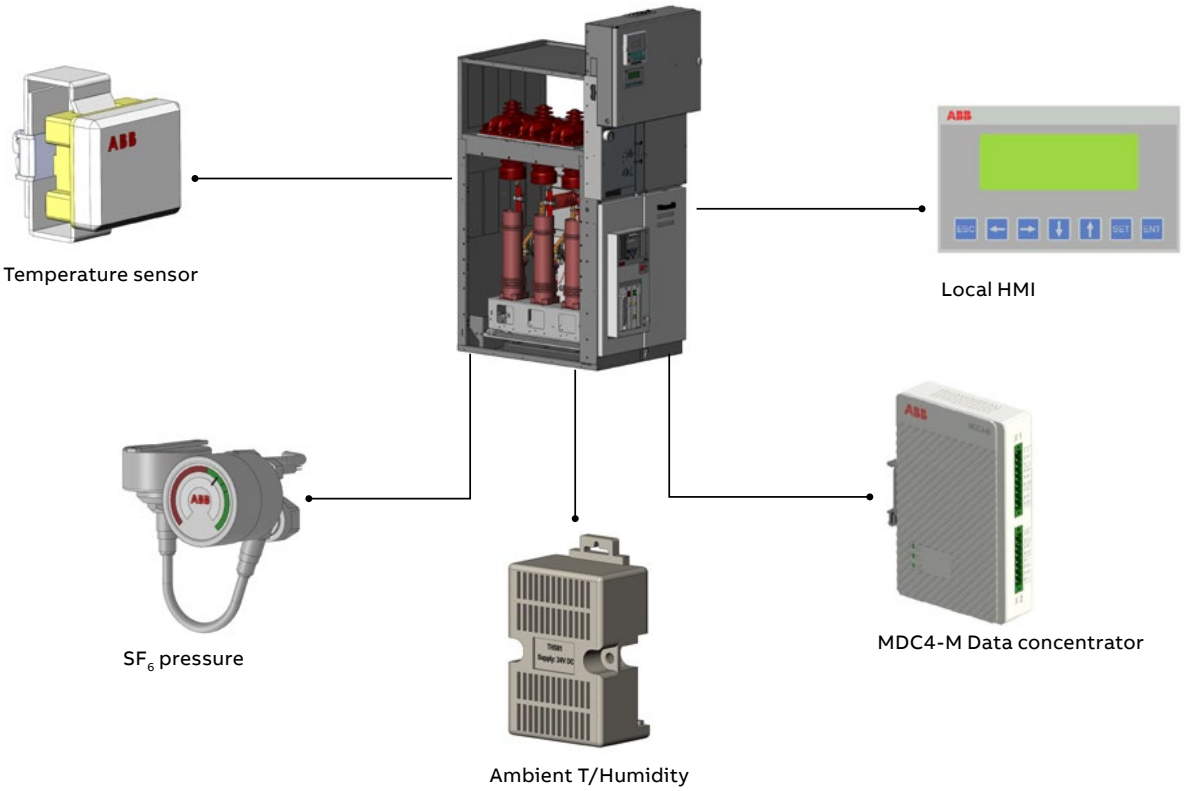
- Concentrator MDC4-M
- Wireless temperature sensors
- Environmental sensor (optional)
- Gas pressure sensor (optional)

Each sensor is connected via cable or in the wireless mode (in the case of temperature sensors) to the concentrator, which collects all the data measured and transmits them to the user via LHMI module or mobile APP.
Typically, 3 wireless sensors are installed in the main circuit of the digital units (cable connection monitoring), but up to 9 can be installed if monitoring relating to circuit-breakers and busbars is required.

The sensors installed in the switchgear enable the following operating parameters to be monitored:

- Temperature of the main circuit (the monitoring points depend on how the switchgear has been configured)
- Temperature and humidity levels in the cable compartment
- ressure of gas in GSec/HySec apparatuses

NOTE
The sensors in the monitoring system do not need to be calibrated



2.1 Maintenance intervals

We recommend carrying out maintenance at the following intervals:

Activity	Interval (years)
Inspection	5(1)
Maintenance	5(1)
Repair	Based on need

(1) In more complex operating conditions, it is recommended to appropriately reduce these intervals

2.2 Inspection

- For UniSec Digital units, the same inspection instructions indicated in paragraph 4.3 of the UniSec 1VFM200005 manual remain valid.
- For the UniSec Digital monitoring system, it is necessary to check the correct communication between the MDC4-M concentrator and all the sensors connected to it.
  If the value “0” is shown in the LHMI module or in the mobile APP, it means that the sensor is faulty or not connected correctly.

In this case it is necessary to check that the wiring is carried out according to the wiring diagram, if it is still not possible to display the measurement correctly, contact ABB.

2.3 Assistance

For UniSec Digital units, the same assistance instructions indicated in paragraph 4.4 of the UniSec 1VFM200005 manual remain valid.

2.4 Repair and replacement

- Based on statistical information and the characteristics of the wireless temperature sensors, it is recommended to replace these sensors every 15 years.
- For UniSec Digital units, the same repair instructions indicated in paragraph 4.5 of the UniSec 1VFM200005 manual remain valid.
- If a component of the monitoring system needs to be replaced, refer to paragraphs 5.6 and 7.

2.5 Measurements transmitted to the LHMI module

The LHMI module allows the parameters measured by the sensors installed in the unit to be monitored. Use the “Up” and “Down” arrows to change screens.

The viewable screens are illustrated and described below.

Health diagnosis screen
This screen shows the general condition of the system by indicating its “health status, which can be:

- **Good**: f all the parameters are within the specified limits
- **Bad**: If at least one parameter is not within the specified limits

The parameter beyond the specified limits appears in the “Diagnosis” line:

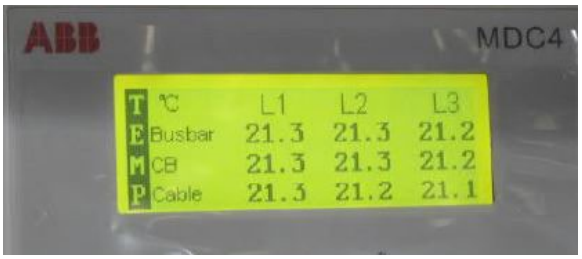
- **Good**: If all the parameters are within the specified limits
- **Temp abnormal**: In the case of temperature imbalance between the phases
- **Gas abnormal**: If the pressure exceeds the limits
- **Temp & Gas abnormal**: If the temperature and gas exceed the limits

“Maxim Temp” indicates the maximum temperature value measured by the wireless temperature sensor in the main circuit.

- **Real time Temp**: This screen displays the absolute temperature measurements in the “Busbar, CB and Cable” points of the main circuit for each of the three phases L1, L2 and L3.

WARNING
There is one LHMI module configuration for all the units. Consequently, value “0” may appear in some units when a temperature sensor has not been installed

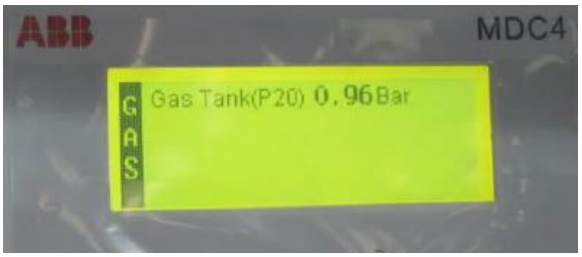
Consult the single-line diagram of the switchgear to find the positions of the sensors that transmit temperature values to the LHMI module.



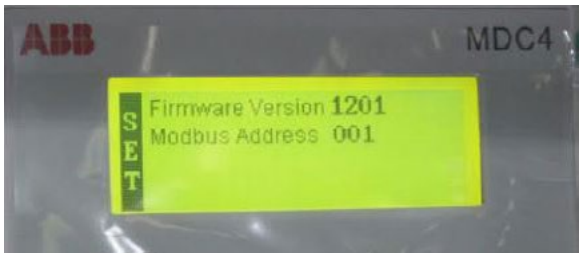
- **Ambient parameters**: The temperature and humidity values measured by the ambient sensor are displayed in this screen.

Consult the single-line diagram of the switchgear to find out where the ambient sensor is installed.

- **Gas tank pressure screen**: The pressure value of the gas-insulated disconnector is displayed in this screen.



- **System setting screen**: This screen displays the firmware version of the monitor and the modbus communication address.



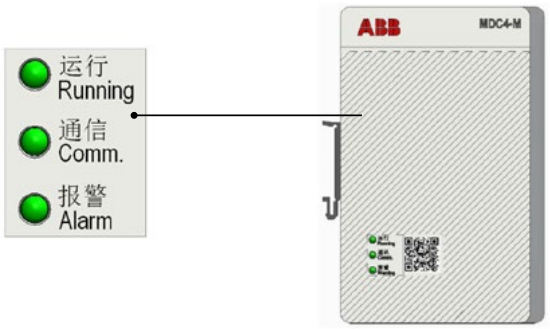
NOTE
Consult manual 2NGA000492 for further details about use of the LHMI module 2NGA000492

2.6 Alarms and corrective

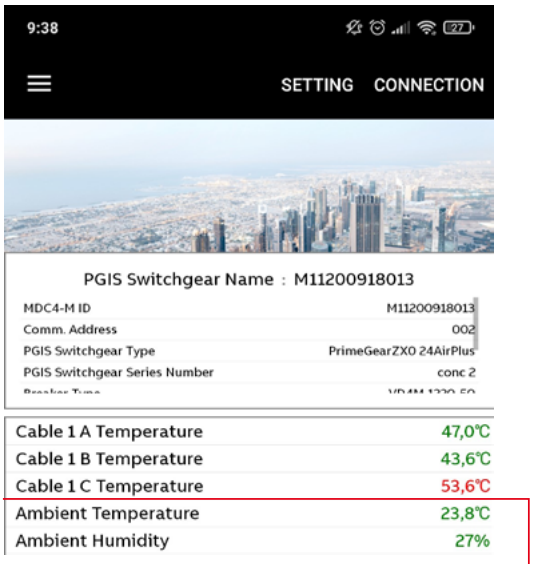
Concentrator MDC4-M is configured by ABB with warning and alarm thresholds for the temperature measurements of the main circuit and for gas pressure measurement.
Using the mobile App, the LHMI module or the leds on the concentrator, you can check whether the values measured in real time exceed the alarm thresholds.

NOTE
The threshold values are defined on the basis of the characteristics of the components installed and the tests performed to ensure the apparatus functions correctly.
The threshold values set by the manufacturer cannot be changed.

Once one of the thresholds is exceeded, the concentrator displays an alarm signal via the “Alarm” led on the front of the concentrator while the parameter that has exceeded the threshold is specified in the LHMI module.
The measurement that exceeds the threshold also appears in red in the mobile APP.
The example below shows a screen on the mobile APP where one of the parameters is in the alarm state:



Similarly, the measurement that exceeds the warning threshold is shown in yellow in the mobile APP.



In this case, the temperature value in the “cable 1 c” position exceeds the threshold value and therefore appears in red

NOTE
Consult user manual 2NGA000492 of concentrator MDC4-M for further details

To find out which parameter has exceeded its threshold, check the “health diagnosis” screen or mobile APP and proceed as described below:

- If the alarm is due to temperature imbalance between the phases, maintenance must be planned to find out the reason for the imbalance and restore the circuit to its normal operating conditions
- Comply with the instructions in manual 1VFM200005 if a low or high pressure alarm occurs in GSec/HySec devices:
  - The apparatus must be taken out of service in no-load conditions
  - Identify and resolve the fault
  - Restore the pressure to its rated value and put the apparatus back into service
- In the event of a warning, it means that the parameter is outside the nominal values and is approaching the alarm threshold. In this case it is necessary to monitor the parameter to prevent it from exceeding the alarm threshold and to intervene during the next scheduled maintenance intervention to identify the cause of the anomaly.

NOTE
Consult the UniSec operation and maintenance manual for further details about maintenance operations

WARNING
If one or more of the temperature values in the “Real time Temp” screen exceeds 100°C, maintenance must be planned to find out the reason for the high temperature value and restore the circuit to its normal operating conditions

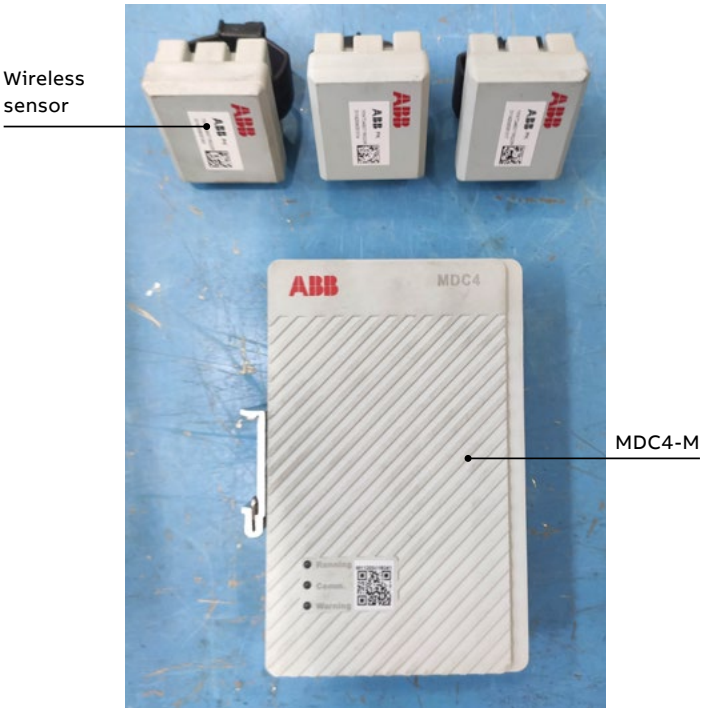
WARNING
The switchgear has been designed for use in normal operating conditions at up to 95% relative humidity for 24 hours and up to 90% for one month. Should the humidity value in the “ambient parameters” screen exceed these values, the useful life of the switchgear could become rapidly reduced

3. Replacement of wireless sensors and concentrator

WARNING
The following operations require access to the cable compartment. Before accessing the compartment, make sure that the circuit-breaker and disconnector (if present) are in the open position. Check that the cables are de-energized and that the earthing switch is open. Make sure that the cables are not supplied in any way.
If maintenance operations are required in the low voltage compartment, first make sure that the compactment is de-energized

NOTE
- **Consult operation and maintenance manual 1VFM200005 for details about tightening torque and other values**
- **The maintenance work must be performed using the tools described in sect. 4.1 of operation and maintenance manual 1VFM200005**
- **Consult the circuit diagram supplied with the switchgear for details about electrical applications**
- **After installing electrical applications, make sure that the wires and cabling do not touch moving components**

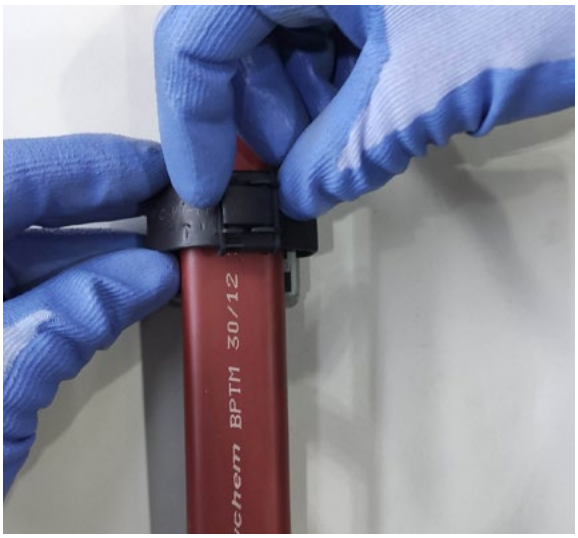
Package content



CAUTION
both the concentrator and all the sensors in the panel must be replaced using the new components provided in the kit.
The sensors in the kit are already synchronized with the concentrator

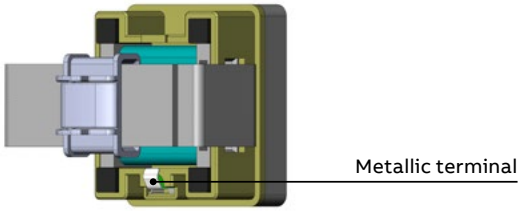
WARNING
If the sensors on the busbars must be replaced, make sure that the busbar compartment is de-energized before proceeding with any operation

a) Remove the old sensor
- Open the clip
- Release the strap



b) Installation of a new sensor
- Assemble each sensor in the correct phase as described in the instructions provided in the kit.

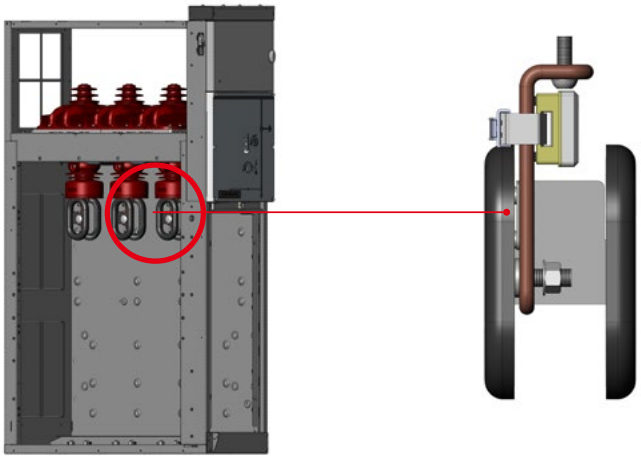
NOTE
the contact tab must be positioned directly on the sheath or copper busbar. Make sure that the tab is not on a level with screws or holes



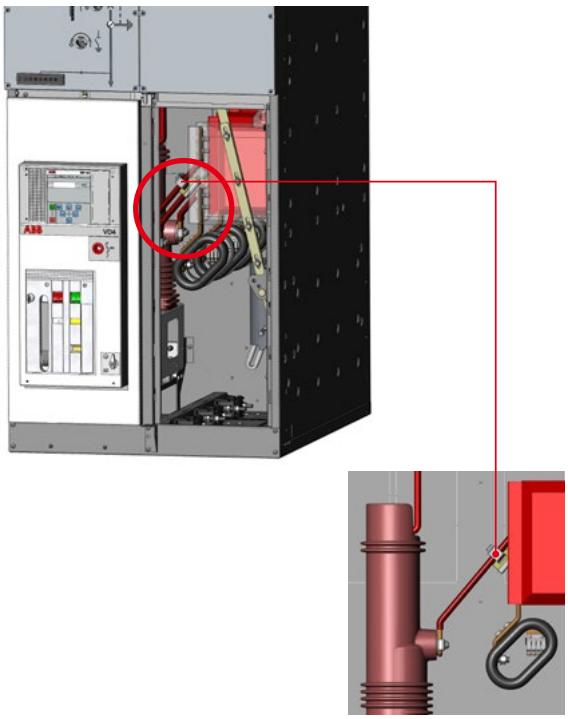
- Set the new sensor in the same position as the old one.
- Fasten the strap around the busbar, then make sure that the sensor remains firmly in contact with the busbar and cannot move.
- Wrap the sensor strap around both busbars if there are two busbars per phase.

c) Repeat the operation for all the sensors in the panel.

Example of assembly on the cable connection



Example of assembly on cable connecting to CT



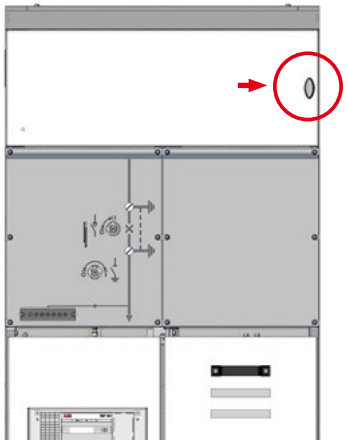
To make sure that communication is correct, energize the circuit where the sensors are installed using a current value of at least 50A AC and check that the temperature measurement appears on the APP or LHMI module.

d) Replacement of concentrator.

WARNING
Make sure that the low voltage compartment is de-energized before replacing the concentrator

3. Replacement of wireless sensors and concentrator

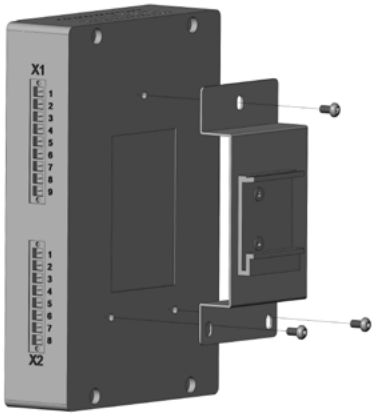
- Open the low voltage compartment door.



- Unscrew the fastening screws of both connectors.

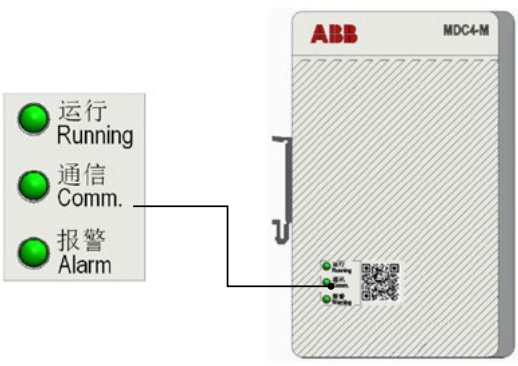
- Detach the connectors.
- Press upwards to detach the concentrator from the DIN rail.

- Detach the bearing plate from the rear part of the old concentrator and fasten it to the new concentrator.

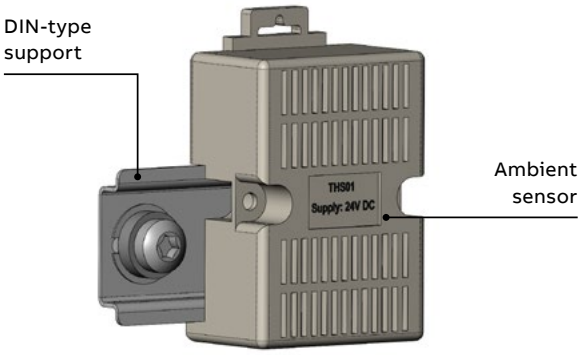


- Fasten the new concentrator to the DIN rail.
- Re-connect the connectors and screw them onto the concentrator.

- Energize the low voltage circuit.
- Make sure that the “Running” led flashes and that the “Comm” led is on.
- Consult the MDC4-M user manual for further details.

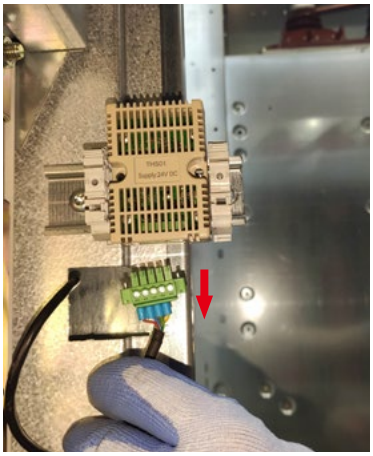


4. Ambient sensor replacement

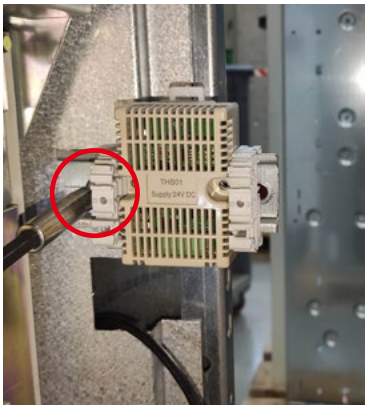


A) Remove the old sensor

- Detach the connector from the sensor.

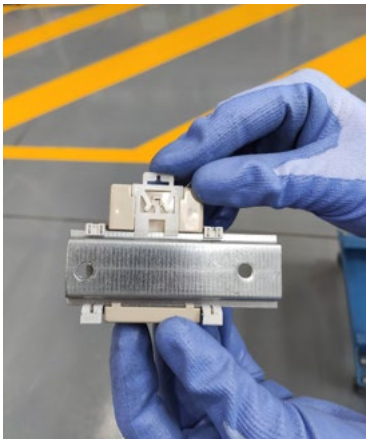


- Unscrew the fastening screw of the DIN rail.
- Remove the sensor.

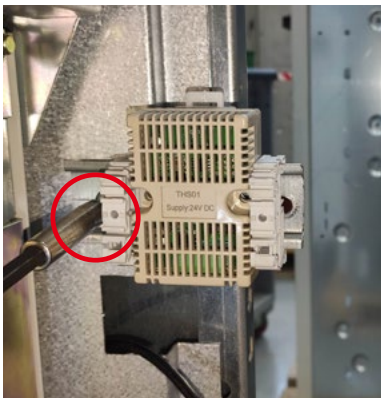


b) Install the new sensor

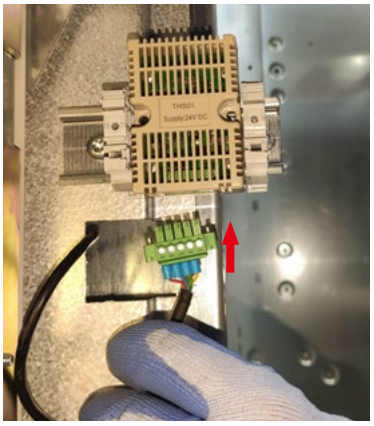
- Fasten the sensor to the DIN rail.



- Fasten the support to the structure.



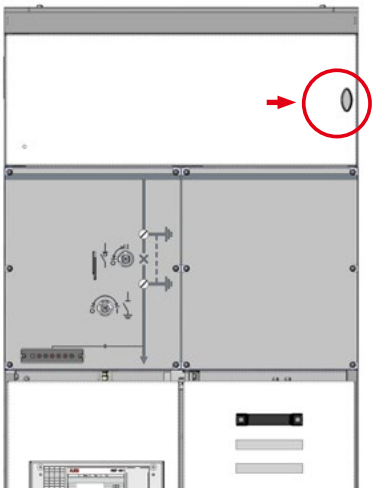
- Connect the connector to the sensor.



- Make sure that the ambient temperature and humidity measurements are transmitted correctly by the interface devices.

5. LHMI module replacement

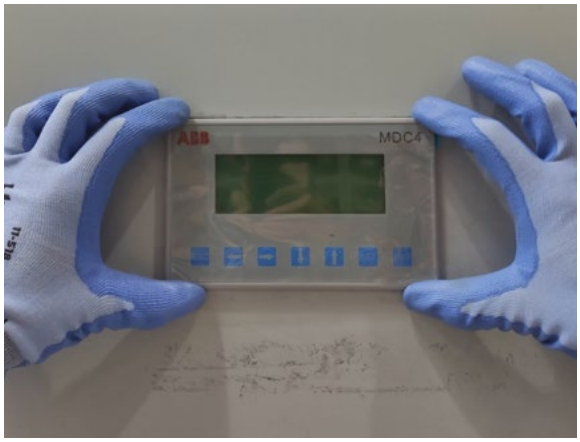
a) Remove the old monitor
- Open the low voltage compartment door.



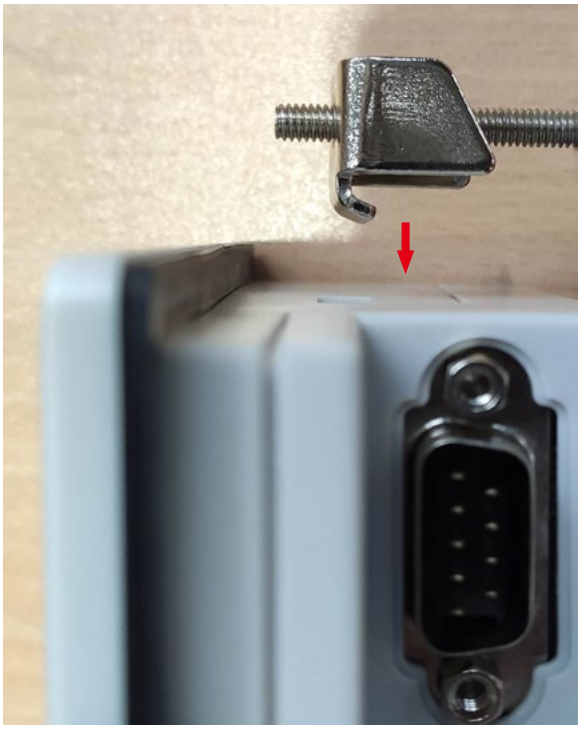
- Disconnect both the supply and signal connectorse.

- Unscrew the side supports of the module.

- Remove the old monitor from the door and insert the new one.



- Fasten the side supports of the screen.



- Connect both the supply and signal connectors.
- Close the low voltage compartment door.

- Energize the LHMI module and make sure that the sensor measurements are transmitted to the monitor.

For more information please contact:

More product information:
abb.com/mediumvoltage
Your contact center:
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More service information:
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