

//////// Invest in Confidence //////////////////////////////////////

Fieldbus Solution  
SMART CONTROL

# Smart Control

## Powerful control interface for large quantities of motor operated valves

### Product overview



### Product benefits

#### • Compact & Efficient

- > Our SmartControl is a compact and powerful device, i.e., the redundant controllers are housed in a single enclosure.
- > Both SC2X2 and MS202e have faster data rate compared to conventional systems. It needs only one to five second(s) to scan the entire installation while being able to send simultaneously multiple orders.
- > Hot Standby Redundant : in a dual-redundant configuration, both processors are running continuously with their program scans synchronized over the fiber optic link. If one processor fails, the other takes control with a bumpless transfer in which the outputs do not change state.

#### • Easy to use and to configure

- > Our SmartControl is a ready-to-work solution which eases the command and control of large quantities of motor operated valves by the mean of a fieldbus. It will help you saving time and resources. Because BERNARD CONTROLS Master Station is already set up, you will save precious time during the commissioning phase. Just cable it and the system is ready to work.
- > Easy to use thanks to the extra-large panel-mounted display with touch screen and vivid colours.
- > Build in webserver: no gateways or other webserver are required. All these functionalities are directly available in the SmartControl : operate the valve, retrieve data and alarms, log the data...

#### • The SmartControl makes the maintenance easier

- > INTELLI+® advanced control solution provides users with a great deal of information to help with system diagnosis and aid in scheduling valves' preventative maintenance. Combined with the SmartControl you benefit then from a system which monitors easily and continuously every actuators of your installation.
- > Remove actuator without line interruption, thanks to Bernard Controls BU box (see dedicated focus on p.3).

- > The system is capable to display all diagnostic alarms including those for actuators, network Diagnostics shall also identify and display the exact location of network fault. It has its dedicated self-diagnostic features to find out faults like cable fault (for cable open and cable short or grounded), communication failure, faults, alarms, etc.) and it has real time clock to monitor alarm events/data/faults and it should be in sync with clock (if MODBUS TCP, else if MODBUS RTU link to DCS/PLC, clock is manually set).
- > Maintenance is also made easier thanks to the archiving of alarms, 64MB data logging memory directly in the Master Station.

#### • For each application, our suitable innovation

- > Different configuration of SmartControl to fully answer your needs and to fit at best your requirements.
- > MS202e model : dual redundant configuration, supports Profibus DPV1 to connect BC actuators in the field, up to 120 actuators, 3s to scan 120 actuators (10km)...
- > SC2X2 model :Modbus loop redundancy to allow a Modbus network, with all its slave MOVs, to be connected in a ring. This will create self-healing ring where a line break will not cause any slave MOV to lose communication with Modbus Master. Up to 240 actuators, between 16 and 20 msec to scan 120 actuators (10km).

#### • Our SmartControl supports Advanced Monitoring and Diagnostics for Predictive Maintenance

- > Advanced monitoring and diagnostic functions thanks to INTELLI+® Integrated Control: Emergency Shut Down (ESD), Partial Stroke Test (PST), programmable timer, alarm customization, programmable signaling relays, operation monitoring...

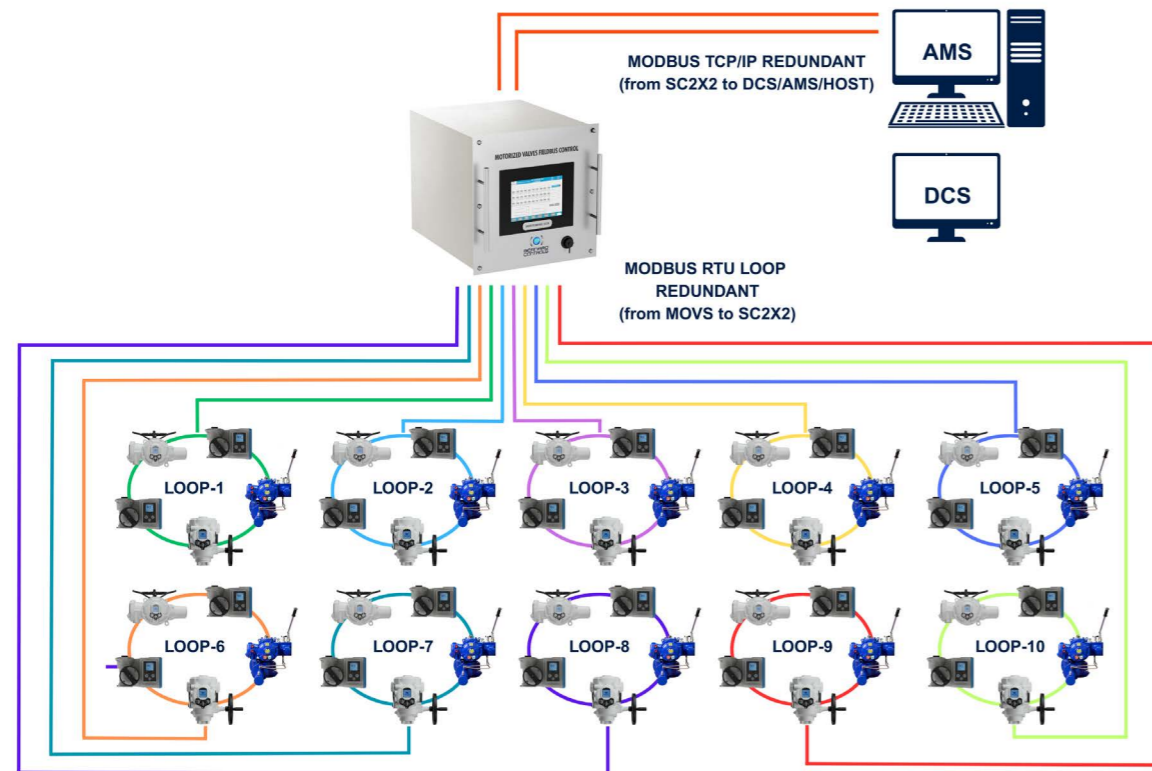


## SMARTCONTROL SC2X2

### Advanced Features

- > Hot Standby Redundancy
- > Less Components
- > Less Cabling / Single Channel
- > No external repeaters required
- > Compact / Single Enclosure
- > Bigger Display/ 10" Panel-mounted HMI
- > Built-in Webserver from HMI
- > Non-proprietary, open protocol
- > Faster data rate than conventional systems
- > Multiple independent redundant networks
- > Easy operation, fault finding and maintenance

Multiple Independent networks mean easy identification of line fault, easy maintenance and troubleshooting.



### 2 options available

#### Compact version

19" RACKMOUNTABLE  
1 loop of maximum 240 MOVs allowing for max 1km between two actuators.

#### Standard version

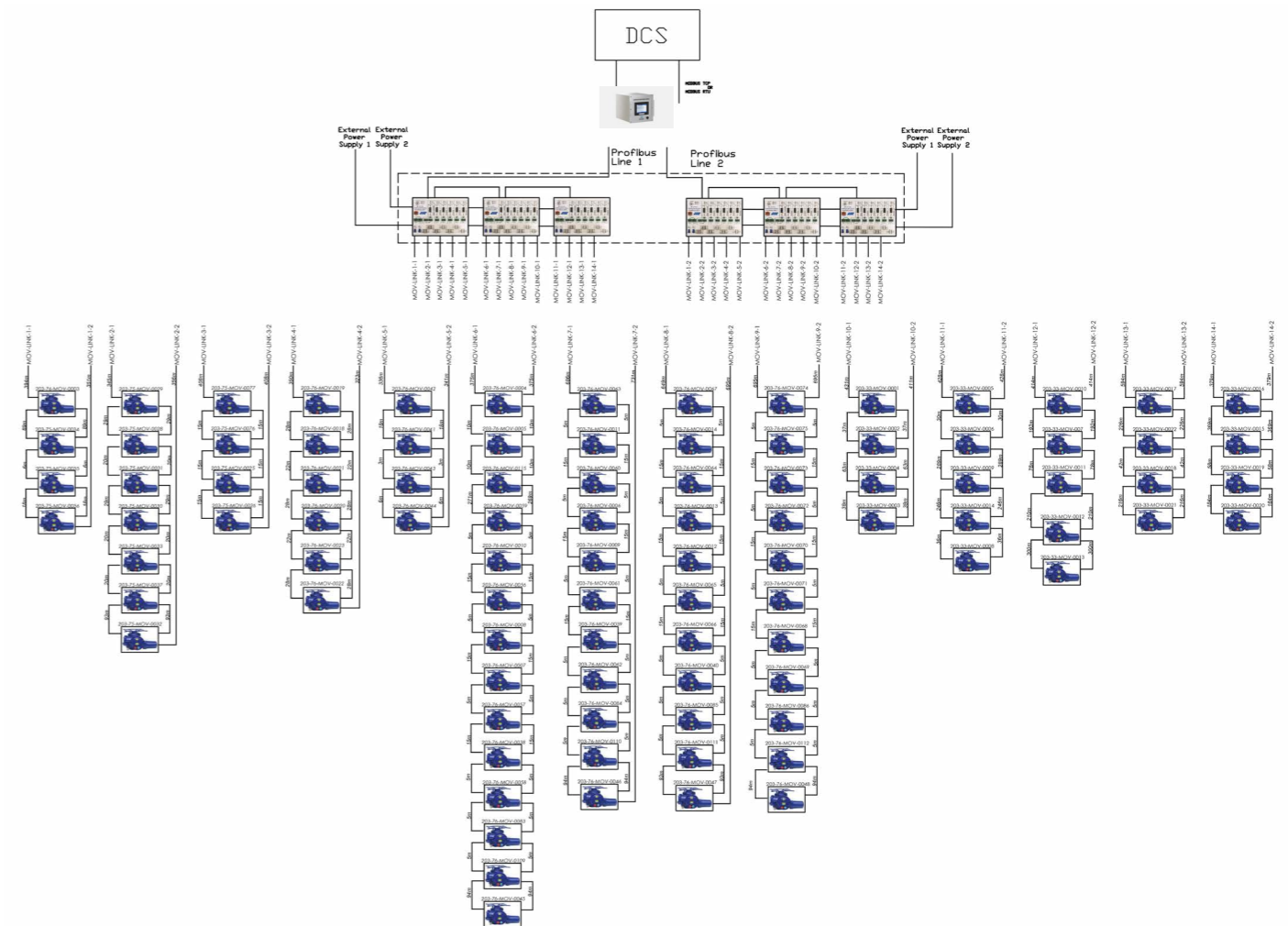
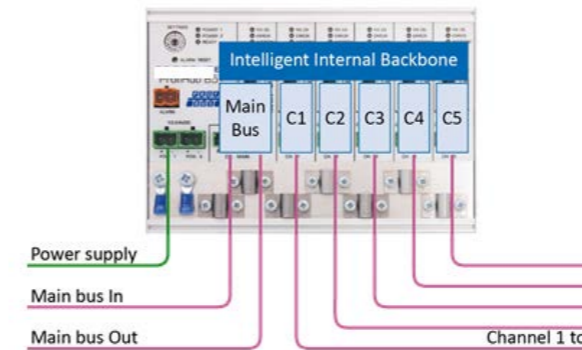
Max of 10 loops with 240 MOVs allowing for max 1km between two actuators.  
Cabinet design can be customized.



## SMARTCONTROL MS202e

### Advanced Features

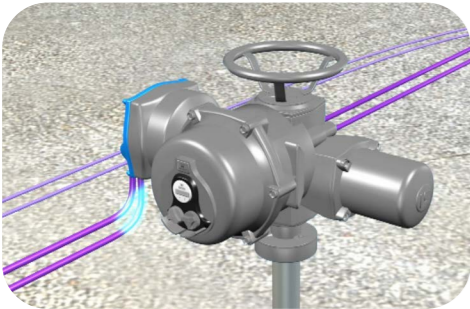
- > Repeaters can also be used to get additional fieldbus lines if placed at PLC output. Each line is independent from the others and therefore a problem on a line does not affect the others.
- > Each network / spur length can range up to 1200 m depending on transmission speed, i.e., 9.6kbps to 12 Mbps, 31 devices per channel.
- > No limit in serial placement or cascading of Profihubs but limited by bus parameters e.g., in BC limited to 4 Profihubs to have max 20 networks.





Focus on...

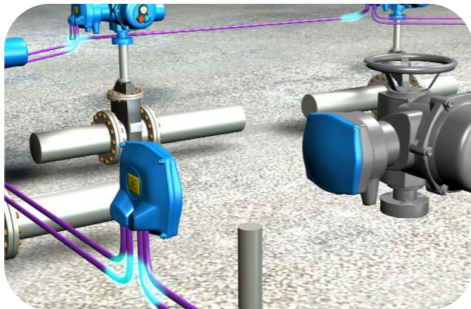
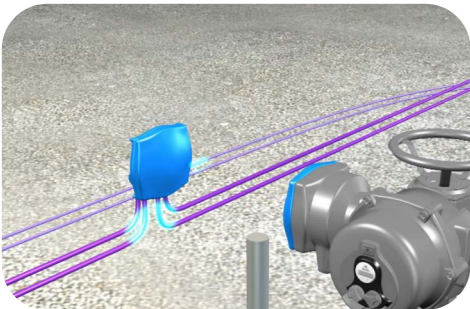
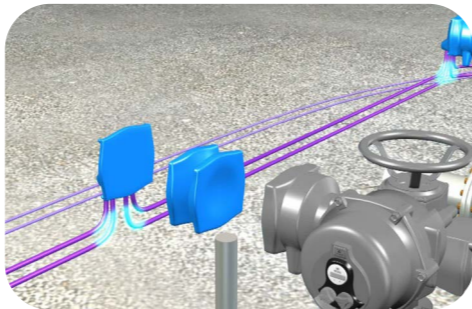
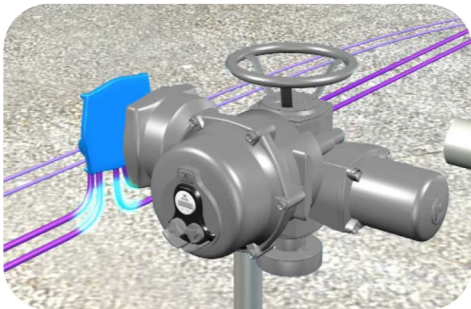
## ➤ Removing an actuator without line interruption



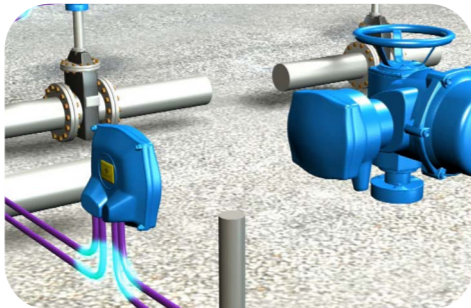
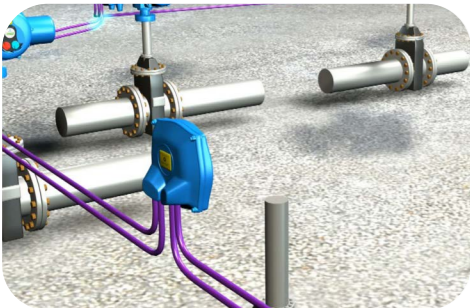
Fieldbus is advantageous because it allows getting more information while reducing the overall wiring on site. However, when you break up the continuity of the line, for instance because of one actuator being retrieved from the field for maintenance, your whole installation is affected since the signal cannot circulate anymore.

BERNARD CONTROLS actuators can host a special Modbus/Profibus connection board<sup>1</sup>. It is located in the cover of the wiring compartment. This cover can simply be removed from the actuator and closed tight by a special type plate.

The resulting so-called “BU” type box ensures continuity of signal throughout the line even when the actuator is removed from the field.



Maintenance is then facilitated since you can disconnect an actuator for repair or replacement, while maintaining signal transmission.



1 - Standard on Explosionproof actuators, on option for Waterproof actuators.

| PRODUCT SPECIFICATIONS                |  |  |
|---------------------------------------|--|--|
| SPECIFICATIONS                        | MS202e   | SC2X2  |
| REDUNDANCY                            | Hot standby redundancy, bumpless switchover in msec as standard  | Hot standby redundancy, bumpless switchover in msec as standard  |
| COMPACT & COMPETITIVE DESIGN          | Redundant, total of 2 racks is housed in a single enclosure as standard  | Redundant, total of 2 racks is housed in a single enclosure as standard  |
| DATALOGGING<br>MEMORY SIZE CAPABILITY | 64MB built-in program memory   | • 64MB built-in program memory<br>• 5GB memory expansion   |
| HOUSING                               | <ul style="list-style-type: none"><li>• Installation in 19" rackmount</li><li>• Dimensions: 500Lx465Wx400H as standard (can be customized)</li><li>• Integral 10" multitouch screen as user interface</li><li>• Material : Mild Steel 1.5mm thick RAL7035 Finish, body and door rear</li><li>• Stainless Steel S5316L 1.5mm thick front door</li><li>• Mounting Plates: 2.0mm thick</li><li>• 2 Nos of Grommet holes at bottom side</li></ul> <p><u>Optional</u></p> <ul style="list-style-type: none"><li>• Customized panel dimension, wall mounted, floor standing (multiloops)</li><li>• HMI available in different sizes as an optional</li></ul> | <ul style="list-style-type: none"><li>• Installation in 19" rackmount</li><li>• Dimensions: 500Lx465Wx400H as standard (can be customized)</li><li>• Integral 10" multitouch screen as user interface</li><li>• Material : Mild Steel 1.5mm thick RAL7035 Finish, body and door rear</li><li>• Stainless Steel S5316L 1.5mm thick front door</li><li>• Mounting Plates: 2.0mm thick</li><li>• 2 Nos of Grommet holes at bottom side</li></ul> <p><u>Optional</u></p> <ul style="list-style-type: none"><li>• Installation on control cabinet</li><li>• Customised panel dimension, wall mounted, floor standing (multiloops)</li></ul> |
| WEIGHT                                | <30 kg (2 controllers in single housing)   | <ul style="list-style-type: none"><li>• Standard version: &lt;30 kg (2 controllers in single loop)</li><li>• Compact version: &lt;60kg (multiloop, single housing)</li></ul>   |
| CONTROL PANEL                         | <ul style="list-style-type: none"><li>• Check the Masterstation status</li><li>• Configure Masterstation (IP address, gateway...)</li><li>• Check actuators status (alarms, signalling...)</li><li>• Configure actuator (Aux commands, Alarms...)</li></ul>  | <ul style="list-style-type: none"><li>• Check the Masterstation status</li><li>• Configure Masterstation (IP address, gateway...)</li><li>• Check actuators status (alarms, signalling...)</li><li>• Configure actuator (Aux commands, Alarms...)</li></ul>  |
| DIAGNOSTICS                           | Diagnostics of Each module component as standard   | Diagnostics of Each module component as standard   |
| CONFIGURATION                         | <ul style="list-style-type: none"><li>• Easy to configure</li><li>• Easy to maintain</li></ul>   | <ul style="list-style-type: none"><li>• Easy to configure</li><li>• Easy to maintain</li></ul>   |
| OPERATION                             | Standalone operation (without host) as standard  | Standalone operation (without host) as standard  |
| WEB SERVER SUPPORT                    | Web Server Support as standard   | Web Server Support as standard   |
| INTEGRATION                           | Easy Integration, with no gateways required  | Easy Integration, with no gateways required  |
| NTP<br>TIME SERVER CONNECTION         | As an option   | As an option   |
| CYCLE TIME                            | <ul style="list-style-type: none"><li>• Cycle time for 5km and 60 actuators: 1.75s</li><li>• Cycle time for 10km and 120 actuators: 3s</li></ul>   | <ul style="list-style-type: none"><li>• Cycle time for 5km and 60 actuators: up to 7s</li><li>• Cycle time for 10km and 120 actuators: up to 14s</li></ul>   |
| ACCESSIBILITY                         | Customer can access all the functions in autonomy, as standard   | Customer can access all the functions in autonomy, as standard   |

| PRODUCT SPECIFICATIONS                           |   |  |
|--|---|--|
| SPECIFICATIONS                                   | MS202e  | SC2X2  |
| COMMUNICATION PROTOCOL                           | <ul style="list-style-type: none"><li>• Between SmartControl and Host /Control System : Modbus RS-485 or MODBUS TCP, Redundant</li><li>• Between SmartControl and actuators : PROFIBUS DPV1, Line Redundant</li></ul> | <ul style="list-style-type: none"><li>• Between SmartControl and Host /Control System : Modbus RS-485 or MODBUS TCP, Redundant</li><li>• Between SmartControl and actuators : MODBUS RTU, Loop Redundant</li></ul> |
| SUPPORT  | <ul style="list-style-type: none"><li>• For Bernard Controls Intelli+® v2 &amp; v3: as standard</li><li>• For third party actuators : optional</li></ul>  | <ul style="list-style-type: none"><li>• For Bernard Controls Intelli+® v2 &amp; v3: as standard</li><li>• For third party actuators : optional</li></ul>   |
| MAXIMUM NUMBER OF ACTUATORS                      | 120 actuators   | 240 actuators  |
| DATA RATE / LENGTH                               | 9.6 Kbps /10km & up to 115.2 Kbps /1km  | 9.6 Kbps /10km & up to 115.2 Kbps /1km   |
| MAX LENGTH                                       | 10 kms  | 30 km and more as per the international standard   |
| AMBIENT TEMPERATURE RANGE                        | 0...+60°C / 32 ... +140°F   | 0...+60°C / 32 ... +140°F  |
| POWER SUPPLY                                     | <ul style="list-style-type: none"><li>• 110-240 VAC (±10%)</li><li>• 50 / 60 Hz</li></ul>   | <ul style="list-style-type: none"><li>• 110-240 VAC (±10%)</li><li>• 50 / 60 Hz</li></ul>  |
| POWER CONSUMPTION                                | 40 Watt max. for each controller  | 40 Watt max. for each controller   |
| MULTIPLE START OF LINE<br>(WITHOUT THE REPEATER) | 20 independent redundant networks   | 10 independent redundant networks  |
| EXTERNAL REPEATER                                | As an optional  | As per the international standard  |
| LIGHTNING PROTECTION<br>(OUTSIDE THE RACK)       | As an optional  | As an optional   |
| FUTURE PROOF<br>SUPPORT FOR INDUSTRIAL ETHERNET  | As per the international standard   | As per the international standard  |
| WIRELESS CAPABILITY                              | As per the international standard   | As per the international standard  |

➤ BC MASTER STATION TECHNICAL FEATURES and OPTIONS

| FEATURES                       | MS202e   | SC2X2  |
|--------------------------------|--|--|
| Redundancy                     | Hot standby system redundancy  | Hot standby system redundancy  |
| Supports field network         | Support field network Profibus DP v1   | Support field network Modbus RTU   |
| Network per unit               | Maximum 20 independent networks per unit   | Maximum 10 independent networks per unit   |
| Maximum field devices possible | Maximum 120 field devices per field network in Profibus DP v1  | Maximum 240 field devices per field network in Modbus RTU  |
| Human Machine Interface        | Single enclosure with 10" multi function HMI that operates redundant system "different sizes available as an option"   | Single enclosure with 10" multi function HMI that operates redundant system "different sizes available as an option"   |
| Supported Baud Rates           | Supported baud rates: 9.6kbps – 12Mbps @ 10km  | Supported baud rates: 9.6 – 115.2 kbit/s @ 30km and more, without any external repeater & max allowable 1km distance between two actuators<br>NOTE: Refer next page showing that 240 MOVs with 9.6 kbps is ATTAINABLE. Also that REPORT BY EXCEPTION scan times are shown i.e., when no changes in MOV status have occurred  |
| Dimensions (W x H x D)         | Dimensions (W x H x D): 485x400x500 mm<br>Dimensions (W x H x D): 800x2000x800 mm<br>Customized size available as an option.   | Dimensions (W x H x D): 485x400x500 mm<br>Dimensions (W x H x D): 800x2000x800 mm<br>Customized size available as an option.   |
| Paint                          | RAL7035 As Standard, Special Painting On Request   | RAL7035 As Standard, Special Painting On Request   |
| Optional features              | <ul style="list-style-type: none"><li>• Air flow switch.</li><li>• Door switch with led inside panel.</li><li>• Status LED (power supply fault).</li><li>• HMI at least 10" or above.</li><li>• Access to controllers/HMI for backup/ programming from outside the panel.</li><li>• USB to export reports.</li><li>• History log and Alarm/Events.</li><li>• I/O module for power supply and utilities Alarms.</li><li>• Cabinet alarms:<ul style="list-style-type: none"><li>• Fan failure.</li><li>• Earth leakage detection</li><li>• Power Fault</li><li>• Temperature alarm.</li><li>• Door open alarm</li><li>• Lockable hinged doors.</li></ul></li><li>• Door Opening hinges and door stop mechanisms shall be of easy unlock type, to enable fast movement / closure in case of emergency evacuations.</li><li>• EMC with certificate.</li><li>• Hot Redundant controllers with G3 conformal coating controller with certificate.</li><li>• Two Separate power feeder from UPS and Non-UPS.</li><li>• Power supply surge protection.</li><li>• Power socket.</li><li>• Dual Redundant power supply.</li><li>• Integral fuse protection.</li><li>• Over temperature protection (Thermostat with adjustable set point).</li></ul> | <ul style="list-style-type: none"><li>• Air flow switch.</li><li>• Door switch with led inside panel.</li><li>• Status LED (power supply fault).</li><li>• HMI at least 10" or above.</li><li>• Access to controllers/HMI for backup/ programming from outside the panel.</li><li>• USB to export reports.</li><li>• History log and Alarm/Events.</li><li>• I/O module for power supply and utilities Alarms.</li><li>• Cabinet alarms:<ul style="list-style-type: none"><li>• Fan failure.</li><li>• Earth leakage detection</li><li>• Power Fault</li><li>• Temperature alarm.</li><li>• Door open alarm</li><li>• Lockable hinged doors.</li></ul></li><li>• Door Opening hinges and door stop mechanisms shall be of easy unlock type, to enable fast movement / closure in case of emergency evacuations.</li><li>• EMC with certificate.</li><li>• Hot Redundant controllers with G3 conformal coating controller with certificate.</li><li>• Two Separate power feeder from UPS and Non-UPS.</li><li>• Power supply surge protection.</li><li>• Power socket.</li><li>• Dual Redundant power supply.</li><li>• Integral fuse protection.</li><li>• Over temperature protection (Thermostat with adjustable set point).</li></ul> |

> BC MASTER STATION TECHNICAL FEATURES and OPTIONS

| FEATURES   | MS202e   | SC2X2  |
|--|--|--|
| Redundant HYBRID CURRENT loop topology                                     | Redundant line topology (PROFIBUS communication)   | Redundant line topology (PROFIBUS communication)   |
| Proprietary protocol   | Profibus is open protocol, non proprietary   | Modbus is open protocol, non proprietary   |
| Communication to the host is established via RJ45 Ethernet with MODBUS TCP | Communication to the host is established via RS-485 with Modbus RTU or RJ45 Ethernet with Modbus TCP | Communication to the host is established via RS-485 with Modbus RTU or RJ45 Ethernet with Modbus TCP |

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