

# M4M Network analyzers

## Accurate electrical measuring and power monitoring.

Simple in every aspect, M4M enables accurate energy efficiency evaluations and perfectly fits the ABB solution for monitoring, optimization and control of electrical system.

**Accurate measurement**  
Class 0,5 measurement according to IEC 61557-12 and advanced power quality functionalities, including historical measurements.

**Option for MID Approval**  
Class C accuracy in accordance with 2014/32/EU for billing applications

**Clear visualization**  
Color display and App-structured menu for advanced graphic visualization.

**Smart commissioning**  
Bluetooth module for easy configuration through EPiC Mobile App unique commissioning tool.

**Intuitive access**  
Simplified access to the device via touch screen display or 5 pushbuttons keypad.

**Easy to install**  
Fast one-hand mounting and comfortable installation with clips in only 57 mm depth inside the panel.

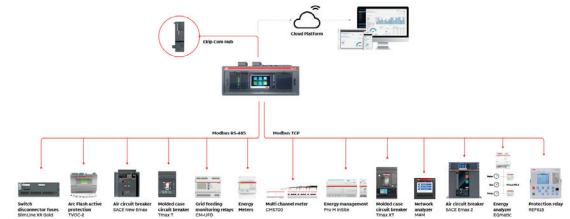
**Fast wiring**  
All-removable terminals and one tool process to speed up the wiring activities.

**Full communication**  
ABB Ability™ native network analyzers with complete communication protocols and I/O options for integration in any system.



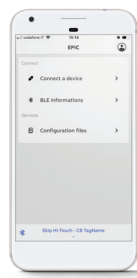
**Intuitive interface**

Touchscreen display and easy-to-access App-structured menu make network analyzers' configuration and operation simple and quick. Graphic color display for advanced visualization of the Class 0,5S accurate parameters, interactive pop-ups and complete notifications. Quick navigation is ensured by Homepage and favorite page setting.



**Full integration**

Natively integrated in sub-distribution management System pro M compact InSite and ABB Ability™ Energy and Asset Manager cloud-solution. To allow monitoring, optimization and control of the complete electrical system. Wide integration in all main applications through embedded communication protocols (Modbus RTU, Modbus TCP/IP, BACnet/IP, Profibus DP V0).



**Smart commissioning**

All M4M network analyzers are equipped with Bluetooth BLE module, ensuring smart configuration and quick visualization via unique EpiC commissioning tool, both available as mobile App and desktop software. Availability of remote firmware update regularly at any time guarantees the latest and the most secure version of the device with no impact on operations.

**Installation in any panel**

Comfortable installation and secure fix on the panel is ensured by the easy-to-use clips, with different thickness setup for compatibility with any panel. One-hand mounting of the device thanks to the hooks on the housing. The reduced depth of only 57 mm inside the panel makes M4M suitable even in small-size switchboards.



**Fast installation and wiring**

All terminals on M4M are removable, including the current transformers (CTs) inputs for current measurement, allowing to carry out the wiring directly on the terminals and speeding up the process. Moreover, the vertical disposition of the terminals makes the cabling inside the switchboard more comfortable.



**Rogowski coils compatibility**

Specific M4M versions compatible with ABB's R4M Rogowski coils allow to retrofit in existing installations, integrating power quality metering with 0 downtime. The pre-wired terminals of R4M coils allow to save up to 70% time for current transformers cabling compared to standard CTs.

# Technical features



M4M 20



M4M 30



M4M 2X

## Auxiliary power supply

Voltage range	[V]	48 - 240 V AC/VDC $\pm$ 15 %	
Frequency	[Hz]	50 - 60	
Power consumption	[VA]	10 VA max	
Installation category		CAT III 300V class per IEC 61010-1 edition 3	
Protection fuse		T1 A - 277 VAC	

## Measurement accuracy

Measurement type		True RMS up to the 40 <sup>th</sup> harmonic 128 samples per cycle, zero blind		
IEC 61557-12		IEC 61557-12 PMD/S/K70/0,5		
Active energy		Class 0,5 acc. to IEC 61557-12 [*] Class 0,5S acc. to IEC 62053-22		
Reactive energy		Class 2 acc. to IEC 61557-12 Class 2S acc. to IEC 62053-23		
Active power		Class 0,5 acc. to IEC 61557-12		
Reactive power	Class 2 acc. to IEC 61557-12	Class 1 acc. to IEC 61557-12	Class 1 acc. to IEC 61557-12	
Apparent power		Class 0,5 acc. to IEC 61557-12		
Voltage		Class 0,2 acc. to IEC 61557-12		
Current		Class 0,2 acc. to IEC 61557-12		
Neutral current	Calculated	Class 0,2 acc. to IEC 61557-12	Calculated (2X, 2X PQ1, 2X RTS) Class 0,2 acc. to IEC 61557-12 (2X PQ2)	
Frequency		Class 0,1 acc. to IEC 61557-12		
Unbalances (Current, Voltage)		Class 0,2 acc. to IEC 61557-12		
Harmonics, THD (Current, voltage)		Class 1 acc. to IEC 61557-12		

## Voltage measurement inputs

Measurement range	[V]	50 - 400 V AC (L-N) 87 - 690 V AC (L-L)	
Measurement category		400V~ (CAT III)	
Rated frequency	[Hz]	50/60 Hz	
Max. VT Primary (indirect connection)	[V]	500 kV AC (L-N)	
Max over voltage	[V]	800 V AC (L-L)	
Protection fuse	[V]	T1 A - 277 V AC	

## Insulation characteristics

Test Voltage impulse @230V to accessible parts		6,4 kV 1,2/50 $\mu$ S		
Test Voltage impulse @400V to accessible parts		9 kV 1,2/50 $\mu$ S		
Test Voltage @230V to accessible parts		3 kV 60s @2000m		
Test Voltage @400V to accessible parts		3,6 kV 60s @2000m		

## Current measurement inputs

Number of current inputs	3 (L1, L2, L3)	4 (L1, L2, L3, N)	3 (2X, 2X PQ1, 2X RTS), 4 (2X PQ2)	
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M4M 20



M4M 30



M4M 2X

<b>Indirect insertion with CT</b>			
CT rated secondary current		5 A (Class 0,5S)	
		1 A (Class 0,5S)	
Max primary CT		50kA	
Measurement range without accuracy derating		10 mA - 6 A	
Starting current		1 mA	
Burden		0,024 VA at 6 A	
<b>Indirect insertion with Rogowski coils</b>		<b>M4M 20 Rogowski</b>	<b>M4M 30 Rogowski</b>
Rated current		10.000 A	-
Measurement range without accuracy derating		100 A - 12 kA	-
Length of coils connections cable to M4M		3m	-
Starting current	[A]	10 A	-
<b>I/O</b>			
<b>Digital Output</b>			
Voltage (min - max)		5 - 240 V AC/DC	
Current (min - max)		2 - 100 mA	
Max ON state drop voltage		1,5 V	
Max R value at Min voltage conditions (5 V)		1750 Ohm	
Min R value at Max voltage conditions (240 V)		2400 Ohm	
Pulse duration	[ms]	20 ms ON, 20 ms OFF	
Pulse frequency		25 Hz	
Alarm activation delay	[s]	1 - 900 s (programmable)	
Alarm return hysteresis		0 - 40 % (programmable)	
<b>Digital Input</b>			
Maximum voltage		240 V AC/DC	
Max voltage for OFF state on input		20 V AC/DC	
Min voltage for ON state on input		45 V AC/DC	
<b>Analogue Output</b>			
Programmable electrical span		Span [0 - 20 mA or 4 - 20 mA]	-
Load		Typical 250 Ohm, max 500 Ohm	-
<b>Technical data for MID version</b>		<b>M4M 20-M</b>	<b>M4M 30-M</b>
MID standards			EN 50470-1, EN 50470-3
Voltage measurement (type of network and rated voltage)			3Ph/4W - 3Ph/3W - 1Ph/2W, 3x230/400...3x400/690V
Current rating (I min- I ref(I max))			0,01-1(6) A
Rated frequencies			50 Hz and 60 Hz
Active Energy accuracy class			Class C
Pulse value S0 (pulse constant)			200000 imp/kWh
Electromagnetic ambient conditions			Class E2
Mechanical ambient conditions			Class M1
LED indicator pulse frequency	[s]		200000 imp/kWh
LED indicator pulse length			1ms

# Technical features



M4M 20



M4M 30



M4M 2X

## Mechanical characteristics

Overall dimensions	96 mm x 96 mm x 77 mm (Depth inside the switchboard: 57 mm)	96 mm x 96 mm x 77 mm (DIN-rail mounting)
IP degree of protection (acc. to IEC 60529)	Front: IP54	-
Weight	[g]	400

## Terminal characteristics

Voltage inputs	Nominal cross section: 2,5 mm <sup>2</sup> Solid/stranded wire: 0,2 - 2,5 mm <sup>2</sup> (AWG 24 - 12) Pitch: 7,62 mm Poles: 4		
Current inputs	Nominal cross section: 2,5 mm <sup>2</sup> Solid/stranded wire: 0,2 - 2,5 mm <sup>2</sup> (AWG 24 - 12) Pitch: 5,08 mm Poles: 6 Screw flanges for fixing	Nominal cross section: 2,5 mm <sup>2</sup> Solid/stranded wire: 0,2 - 2,5 mm <sup>2</sup> (AWG 24 - 12) Pitch: 5,08 mm Poles: 8 Screw flanges for fixing	
RS-485 Serial port	Nominal cross section: 2,5 mm <sup>2</sup> Solid/stranded wire: 0,2 - 2,5 mm <sup>2</sup> (AWG 24 - 12) Pitch: 5,08 mm Poles: 3		
I/O	Nominal cross section: 2,5 mm <sup>2</sup> Solid/stranded wire: 0,2 - 2,5 mm <sup>2</sup> (AWG 24 - 12) Pitch: 5,08 mm Poles: 3 (Programmable I/O, only on M4M 20 I/O) Poles: 3 (Digital outputs) Poles: 3 (Analogue outputs, only on M4M 20 I/O)	Nominal cross section: 2,5 mm <sup>2</sup> Solid/stranded wire: 0,2 - 2,5 mm <sup>2</sup> (AWG 24 - 12) Pitch: 5,08 mm Poles: 5 (Programmable I/O) Poles: 3 (Programmable I/O only on M4M 30 I/O) Poles: 3 (Analogue outputs, only on M4M 30 I/O)	Nominal cross section: 2,5 mm <sup>2</sup> Solid/stranded wire: 0,2 - 2,5 mm <sup>2</sup> (AWG 24 - 12) Pitch: 5,08 mm Poles: 5 (Programmable I/O)
Rogowski current probes	Only with ABB Rogowski probes: - R4M-200 2CSG202150R1101 (200 mm diameter) - R4M-80 2CSG202160R1101 (80 mm diameter)		

## Climatic conditions

Operating temperature	-25 to 70 °C (K70 acc. to IEC 61557-12)
Storage temperature	-40 to 85 °C (K70 acc. to IEC 61557-12)
Relative humidity	Max 93 % (non-condensing) at 40 °C
Pollution degree	2
Altitude	< 2.000 m

## User Interface

Access to device	5 pushbuttons	Touchscreen	-
Display type	Graphic color display		-
Display dimensions	70 x 52 mm (3.5")		-



M4M 20



M4M 30



M4M 2X

<b>Communication protocol</b>			
<b>Modbus RTU</b>	M4M 20 Modbus, M4M 20 I/O, M4M 20 Rogowski, M4M 20-M Modbus	M4M 30 Modbus, M4M 30 I/O, M4M 30 Rogowski, M4M 30-M Modbus	M4M 2X Modbus
Communication interface	RS485 with optical isolation		
Baud rate	9600, 19200, 38400, 57600, 115200 bps		
Parity number	Odd, Even, None		
Stop bit	1, 2		
Address	1-247		
Connector	3 pole terminal		
<b>Profibus DP-V0</b>	<b>M4M 20 Profibus</b>	<b>M4M 30 Profibus</b>	-
Protocol	Profibus with slave DP-V0 function in compliance with IEC 61158 regulations		
Communication interface	RS485 with optical isolation		
Baud rate	Automatic detection [9,6 kpbs - 12 Mbps]		
Address	0-126		
Connector	DB 9 female connector (do not use connectors with 90° cable outlet)		
LED indicators	Green for communication status Red for communication error		
<b>Modbus TCP/IP</b>	<b>M4M 20 Ethernet, M4M 20-M Ethernet</b>	<b>M4M 30 Ethernet, M4M 30-M Ethernet</b>	<b>M4M 2X Ethernet</b>
Protocol	Modbus TCP/IP		
Communication interface	RJ45	RJ45 (2 ports for daisy-chain)*	
<b>BACnet</b>	<b>M4M 20 Bacnet</b>	<b>M4M 30 Bacnet</b>	-
Protocol	BACnet/IP		
Communication interface	RJ45		
<b>Bluetooth</b>			
Type	BLE (Bluetooth Low Energy)		
<b>Real-time clock</b>	Available on 2X PQ1, 2X PQ2, 2X RTS		
Clock drift	-	~ 0,4 seconds per day	
Battery backup time	-	~ 3 days without aux supply	
<b>Standards</b>			
Power metering and monitoring devices (PMD)	IEC 61557-12 (IEC 62053-22, IEC 62053-23)		
Electrical safety	IEC 61010-1		
EMC	IEC 61326-1 (IEC 61000-3-2, IEC 61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11)		

\* 1x RJ45 port available on M4M 30-M

# M4M 20 and M4M 30

## Comparing the two versions



	M4M 20 - Class 0,5S	M4M 30 - Class 0,5S
<b>Accuracy</b>		
<b>MID approval</b>	Optional	Optional
<b>Real-time</b>		
TRMS current	•	•
TRMS voltage	•	•
Frequency	•	•
Active, Reactive and Apparent power	•	•
Power factor	•	•
Operating timer, countdown timer	•	•
<b>Energy</b>		
Active, Reactive and Apparent energy	•	•
4 quadrants Energy (Import/Export)	•	•
Tariffs	/	•
<b>Power Quality</b>		
THD (I, VLN, VLL)	•	•
Individual Harmonics	/	40 <sup>th</sup>
Unbalances (I, VLN, VLL)	/	•
Neutral current	Calculated	Measured
Phasors (I, VLN)	/	•
Waveforms (I, VLN, VLL)	/	•
<b>Data recording and logs</b>		
Single alarms	25	25
Warnings, alarms and errors logs	•	•
Complex alarms with logics	/	4
Demand values (average)	Basic	Advanced
Min/Max Demand values	Basic	Advanced
Energy Trending logs	/	•
RTC	/	•
<b>HMI</b>	<b>Graphic color</b>	<b>Graphic color touchscreen</b>
Graphs visualization	Basic	Advanced
Notifications	•	•
Homepage and favourite page	•	•
Password protection	•	•
<b>Connectivity</b>		
Automatic integration in ABB Ability™ Energy and Asset Manager	•	•
Automatic integration in System pro M compact InSite	•	•
Bluetooth Low Energy	•	•
Communication Protocols	Modbus RTU, Modbus TCP/IP, Profibus DP-V0, BACnet/IP	Modbus RTU, Modbus TCP/IP, Profibus DP-V0, BACnet/IP
RJ45 Daisy Chain (Ethernet version)	/	•*

\* daisy chain not available on M4M 30-M

# M4M 2X

## Functionality packages



### Accuracy

### M4M 2X - Class 0,5S

TRMS current	●
TRMS voltage	●
Frequency	●
Active, Reactive and Apparent power	●
Power factor	●
Operating timer, countdown timer	●
Active, Reactive and Apparent energy	●
4 quadrants Energy (Import/Export)	●
THD (I, VLN, VLL)	●
Neutral current	Calculated
Single alarms	25
Demand values (average)	Basic
Max/min values	Basic
Warnings, alarms and errors logs	●
Digital Outputs	2
<b>+PQ1</b>	
Individual Harmonics	25 <sup>th</sup>
Unbalances	●
Historicals logs	Intermediate
RTC	●
<b>+PQ2</b>	
Individual Harmonics	40 <sup>th</sup>
Unbalances	●
Historicals logs	Advanced
RTC	●
Neutral current	Measured
<b>+RTS</b>	
Tariffs	6
Complex alarms with logics	4
RTC	●
Programmable I/O <sup>1</sup>	4
<b>Connectivity</b>	
Automatic integration in ABB Ability™ Energy and Asset Manager	●
Automatic integration in System pro M compact InSite	●
Bluetooth Low Energy	●
Communication Protocols	Modbus RTU, Modbus TCP/IP
RJ45 Daisy Chain (Ethernet version)	●

<sup>1</sup> instead of 2 Digital Outputs

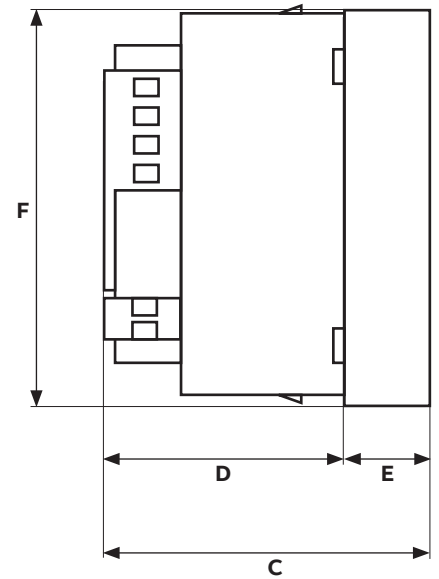
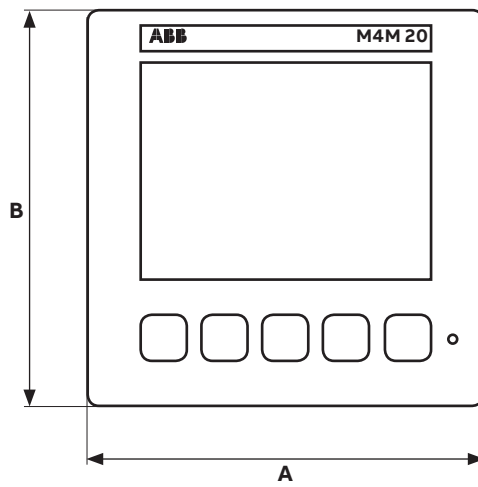


## Overall dimensions

### M4M 20, M4M 30

#### Dimensions

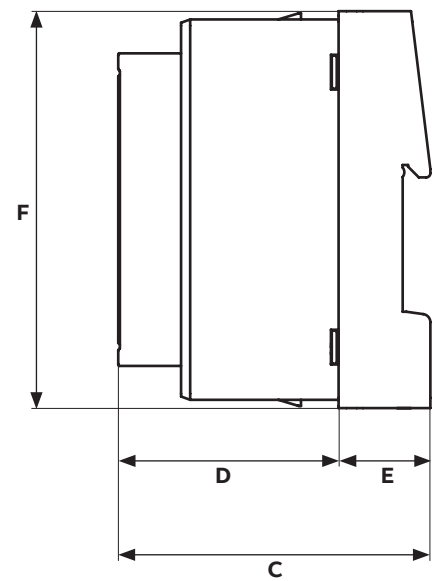
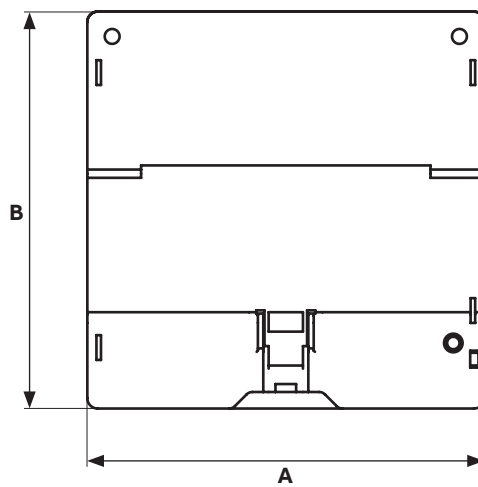
- A: 96 mm
- B: 96 mm
- C: 77,5 mm
- D: 57 mm
- E: 20,5 mm
- F: 92 mm



### M4M 2X

#### Dimensions

- A: 96 mm
- B: 96 mm
- C: 77.5 mm
- D: 53.5 mm
- E: 22 mm
- F: 92 mm





# Ordering codes



## M4M 20

M4M 20 is ABB's network analyzer range that provides complete and accurate electrical parameters monitoring and basic power quality analysis.

Equipped with graphic color display for advanced visualization of the measured parameters and Bluetooth module for smart commissioning.

Communication protocol	I/O	Bbn 8012542 EAN	Order details		Weight 1 piece kg	Pack unit pc.
			Type code	Order code		
BLE	2 Digital out.	511519	M4M 20	2CSG251151R4051	0,400	1
BLE, Modbus RTU	2 Digital out.	511410	M4M 20 Modbus	2CSG251141R4051	0,400	1
BLE, Modbus TCP/IP	2 Digital out.	044710	M4M 20 Ethernet	2CSG204471R4051	0,400	1
BLE, Profibus DP-V0	2 Digital out.	511311	M4M 20 Profibus	2CSG251131R4051	0,400	1
BLE, BACnet/IP	2 Digital out.	368311	M4M 20 Bacnet	2CSG236831R4051	0,400	1
BLE, Modbus RTU	2 Progr. I/O, 2 Digital out., 2 Analogue out.	511618	M4M 20 I/O	2CSG251161R4051	0,400	1
 BLE, Modbus RTU	2 Digital Out.	390558	M4M 20-M MODBUS	2CSG239055R4051	0,400	1
 BLE, Modbus TCP/IP	2 Digital Out.	390657	M4M 20-M ETHERNET	2CSG239065R4051	0,400	1



## M4M 20 - ROGOWSKI VERSION

M4M 20 is also available as compatible with ABB's R4M Rogowski coils for current measurement, increasing the flexibility of network analyzers offer and allowing retrofit in any existing installations.

M4M 20 Rogowski together with R4M Rogowski coils ensures the integration of basic power quality metering in any existing system with 0 downtime.

Communication protocol	I/O	Bbn 8012542 EAN	Order details		Weight 1 piece kg	Pack unit pc.
			Type code	Order code		
BLE, Modbus RTU	2 Digital Outputs	070818	M4M 20 Rogowski	2CSG207081R4051	0,400	1



# Ordering codes



## M4M 30

M4M 30 is ABB's network analyzer range that allows complete power quality analysis and energy efficiency evaluations.

Equipped with touchscreen color display for simplified access to the device and with Bluetooth module for smart commissioning.

Communication protocol	I/O	Bbn 8012542 EAN	Order details		Weight 1 piece kg	Pack unit pc.
			Type code	Order code		
BLE, Modbus RTU	4 Progr. I/O	747611	M4M 30 Modbus	2CSG274761R4051	0,400	1
BLE, Modbus TCP/IP	4 Progr. I/O	746812	M4M 30 Ethernet	2CSG274681R4051	0,400	1
BLE, Profibus DP-V0	4 Progr. I/O	367918	M4M 30 Profibus	2CSG236791R4051	0,400	1
BLE, BACnet/IP	4 Progr. I/O	024514	M4M 30 Bacnet	2CSG202451R4051	0,400	1
BLE, Modbus RTU	6 Progr. I/O, 2 Analogue out.	024712	M4M 30 I/O	2CSG202471R4051	0,400	1
 BLE, Modbus RTU	4 programmable I/O	390350	M4M 30-M MODBUS	2CSG239035R4051	0,400	1
 BLE, Modbus TCP/IP	4 programmable I/O	390459	M4M 30-M ETHERNET	2CSG239045R4051	0,400	1



## M4M 30 - ROGOWSKI VERSION

M4M 30 is also available as compatible with ABB's R4M Rogowski coils for current measurement, increasing the flexibility of network analyzers and allowing retrofit in any existing installations. M4M 30 Rogowski together with R4M coils ensure integration of complete PQ analysis in any existing system with 0 downtime.

Communication protocol	I/O	Bbn 8012542 EAN	Order details		Weight 1 piece kg	Pack unit pc.
			Type code	Order code		
BLE, Modbus RTU	4 Prog. I/O	024613	M4M 30 Rogowski	2CSG202461R4051	0,400	1

## R4M ROGOWSKI COILS

R4M Rogowski coils are flexible current transformer based on Rogowski technology, ideal to retrofit existing installations up to 12kA. Available in two different sizes (80mm or 200mm diameters), R4M coils are directly equipped with pre-wired removable terminals that perfectly fit M4M 20 Rogowski (3 Rogowski coil inputs) and M4M 30 Rogowski (4 Rogowski coil inputs), with no need for external integrators.



Diameter (mm)	Bbn 8012542 EAN	Order details		Weight 1 piece kg	Pack unit pc.
		Type code	Order code		
80	021605	R4M-80	2CSG202160R1101	0,150	1
200	021506	R4M-200	2CSG202150R1101	0,250	1



### M4M 2X

M4M 2X is ABB's network analyzer range that ensuring higher flexibility to project specifications compared to standard network analyzers. M4M 2X is available without display, only communicating via protocols and Bluetooth module for smart remote commissioning.

Communication protocol	I/O	Functionality package	Bbn 8012542 EAN	Order details		Weight 1 piece kg	Pack unit pc.
				Type code	Order code		
BLE, Modbus RTU	2 Digital out.	2X	601111	M4M 2X Modbus	2CSG260111R4051		
BLE, Modbus TCP/IP	2 Digital out.	2X	600619	M4M 2X Ethernet	2CSG260061R4051		
BLE, Modbus RTU	2 Digital out.	2X+PQ1	390756	M4M 2X Modbus PQ1	2CSG239075R4051		
BLE, Modbus TCP/IP	2 Digital out.	2X+PQ1	391258	M4M 2X Ethernet PQ1	2CSG239125R4051		
BLE, Modbus RTU	2 Digital out.	2X+PQ2	390855	M4M 2X Modbus PQ2	2CSG239085R4051		
BLE, Modbus TCP/IP	2 Digital out.	2X+PQ2	391357	M4M 2X Ethernet PQ2	2CSG239135R4051		
BLE, Modbus RTU	4 Progr. I/O	2X+RTS	390954	M4M 2X Modbus RTS	2CSG239095R4051		
BLE, Modbus TCP/IP	4 Progr. I/O	2X+RTS	391456	M4M 2X Ethernet RTS	2CSG239145R4051		
BLE, Modbus RTU	4 Progr. I/O	2X+PQ1+RTS	391050	M4M 2X Modbus PQ1+RTS	2CSG239105R4051		
BLE, Modbus TCP/IP	4 Progr. I/O	2X+PQ1+RTS	391555	M4M 2X Ethernet PQ1+RTS	2CSG239155R4051		
BLE, Modbus RTU	4 Progr. I/O	2X+PQ2+RTS	391159	M4M 2X Modbus PQ2+RTS	2CSG239115R4051		
BLE, Modbus TCP/IP	4 Progr. I/O	2X+PQ2+RTS	391654	M4M 2X Ethernet PQ2+RTS	2CSG239165R4051		