SPIRE METERING TECHNOLOGY

SpireCapture Series

280C-1

Smart M-Bus Concentrator

A member of the SpireCapture™ Series, the 280C-1 Smart M-Bus Concentrator, is the first member of the 4th generation of concentrators from Spire Metering. Compared to other variations, the 280C-1 provides an intelligent gateway to link an M-Bus network to a data center computer through various communication methods: RS232, RS485, Ethernet, GPRS wireless, and BACnet. With its second uplink port, it can link an M-Bus network to both an AMR system and BMS at the same time. This allows an AMR system to read utility meters for billing purposes meanwhile allows a BMS system to access the same utility meters for security and property management purposes.

An M-Bus system is a simple two-wire bus system, widely used in utility metering. It is not only reliable, but also easy and economical to implement.

An M-Bus system consists of an M-Bus master, usually the M-Bus concentrator, and many utility meters with M-Bus interface (slaves).

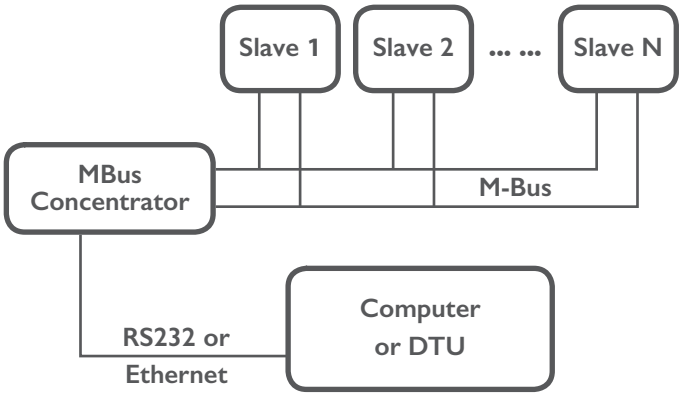
The 280C-1 is a powerful M-Bus master. It is able to discover all the slave meters connected to its M-Bus port, and assign an M-Bus address to each meter automatically. Based on a preset schedule, the 280C-1 can read all slave meters automatically and save data to its large memory. The saved data is non volatile and will remain in memory, even after a power outage.

The 280C-1 can also act as a power supply for its slave meters, so the slave meters are able to save battery life. Furthermore, it can be set to Transparent Mode, allowing it to be used as a transparent level converter.

Spire Metering Technology LLC
249 Cedar Hill Street, Marlborough, MA 01752, USA
Tel +1 978 263-7100 / 888 738-0188 (toll-free)
Fax +1 978 418-9170 sales@spiremt.com www.SpireMT.com

Features & Benefits

- Automatic remote meter reading with M-Bus
- Automatic scanning and discovery
- Programmable meter reading schedule
- Easy to switch to transparent mode
- Supports up to 250 utility meters (90 meters for BACnet)
- Short-circuit protection auto-recovery
- Overload protection alarm
- Large data storage SD card can be easily accessed for data retrieval
- Dual uplink to support both AMR/Billing system BMS system simultaneously
- Various uplink options: RS232, RS485/MODBUS, GPRS, Ethernet, BACnet



Specifications

Function	
Normal Mode:	• M-Bus meter (slave) discovery and addressing • Automatic meter reading • Meter reading schedule • Data storage management • Alarm detection • System configuration
Transparent Mode:	Transmits data upward, transfer commands downward

Interface - Downward	
M-Bus. Default settings:	2400,8,E,1 Half duplex, communicates with one slave at a time
Communication Protocol:	M-Bus (EN1434/EN13757)
Load capacity:	90 M-Bus slaves if uplink is BACnet. Otherwise, 60/120/250 M-Bus devices
M-Bus cable (according to M-Bus Standard recommendation):	The M-Bus uses two wire cables which originate from the M-Bus Master or M-Bus Repeater and connect to each M-Bus device (bus structure). The M-Bus is polarity independent and needs no line termination resistors at the end of the cables. Any cable type may be used as long as the cable is suitable for 42V / 500 mA. Shielding is not necessary and not recommended since the capacity of the cable should be minimized. In most cases a standard telephone cable is used (twisted pair wire with a diameter of 0.8 mm each). However, for long distance, AWG22 or larger cable is recommended. This type of cable should be used for the main wiring. If a slave is less than 5m away from this main cable, a cable with smaller diameter may be used to connect the slave to the main cable.

Interface - Upward

- Communication Protocol:
  (a) MODBUS. Refer to Appendix A for the register table.
  (b) BACnet/IP. Refer to Appendix B for the BACnet points.
  (c) Proprietary protocol, compatible with SpireCapture software suite.

Normal Mode:

- Physical layer:

Uplink Port A	Uplink Port B
M-Bus: 2400,8,E,1	M-Bus: 2400,8,E,1
RS232. Default: 2400,8,E,1	RS232. Default: 2400,8,E,1
RS485/MODBUS. Default: 9600,8,N,1	RS485/ MODBUS. Default: 9600,8,N,1
Ethernet	Ethernet
GPRS wireless	
BACnet/IP	

Transparent Mode:

- Communication Protocol: M-Bus (EN1434/EN13757)
- Physical layer: M-Bus/RS232/RS485. Default settings: 2400,8,E,1

Data Logger

A large memory SD card is used to store historical data. The SD card can be removed from the concentrator easily, and then plugged into a PC to upload the data

LEDs

Indicators for communication status, overload alarm and power

Overload Protection

If the number of M-Bus meters is more than a certain amount, the alarm lamp will flicker. After clearing the fault, the equipment will return to normal operation

Short-Circuit Protection

If the bus is short-circuited, the alarm lamp will keep lit and the communication will be interrupted. After clearing the fault, the equipment will return to normal operation

Power

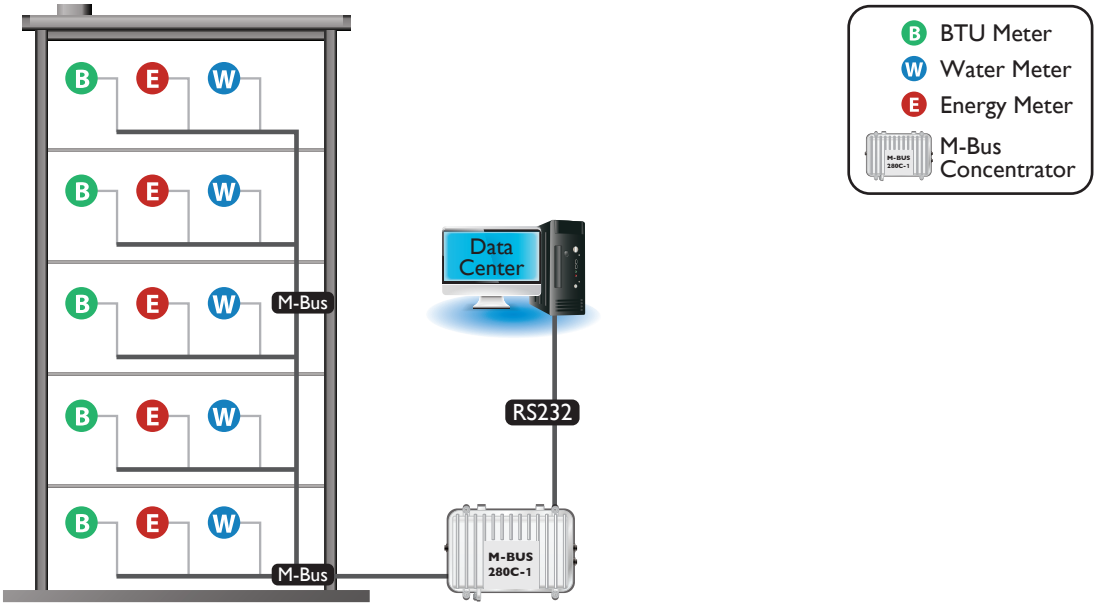
110-240VAC / 24Watts

Enclosure

Aluminum, IP65. Dimension: 250mmx205mmx80mm (10”x8”x3”)

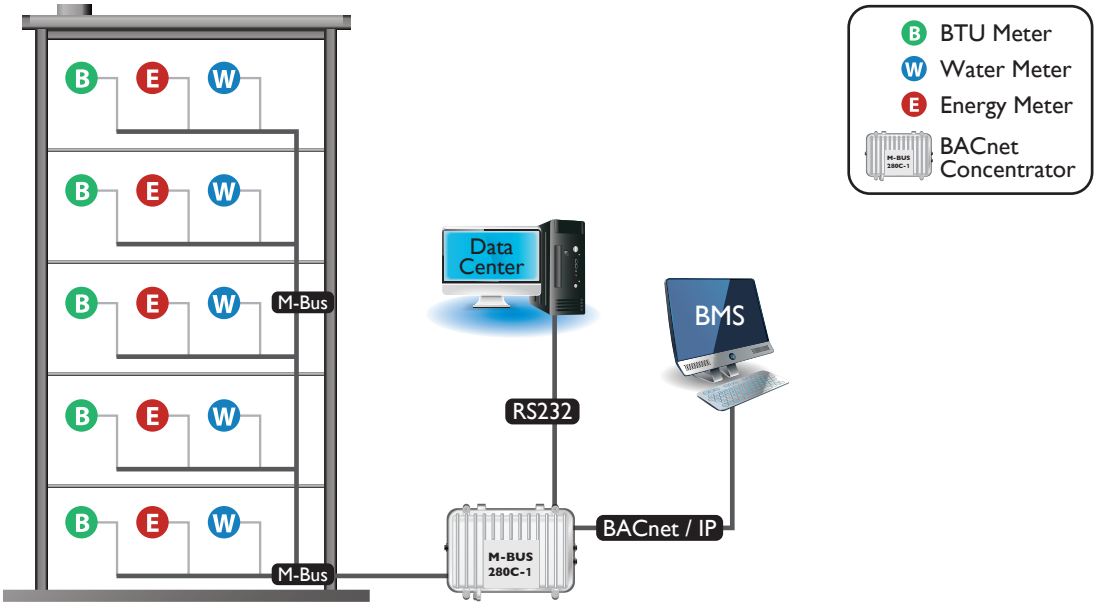
Applications

1. A simple AMR system based on Basic M-Bus Concentrator (280C-1-B) with RS232 uplink

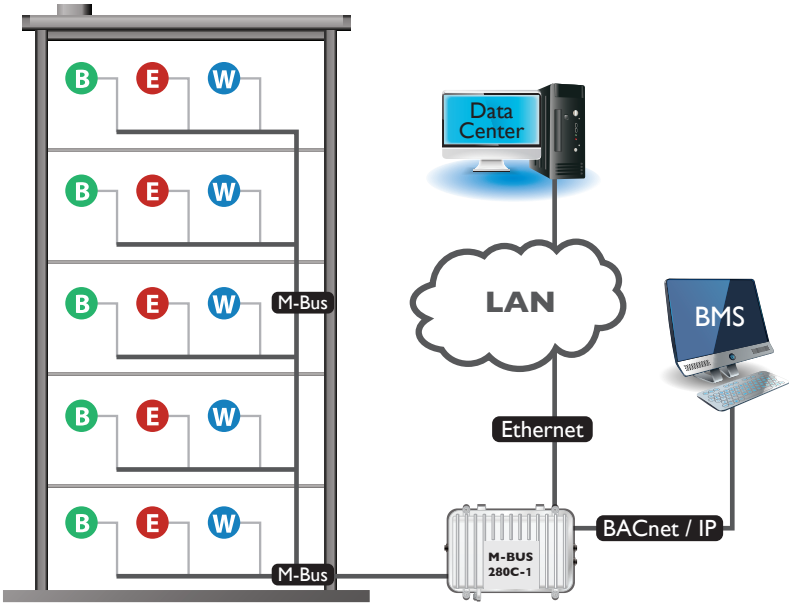


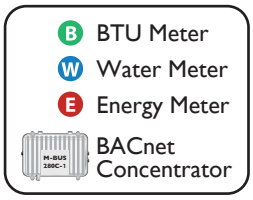
2. A typical AMR system based on BACnet Concentrator (280C-1-F) with BACnet/IP uplink for BMS and serial or Ethernet uplink for AMR/billing

Connect meters to BMS through BACnet and to AMR/Billing Data Center through serial port

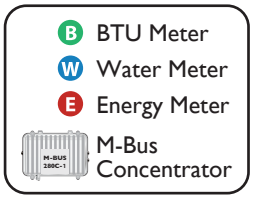


Connect meters to BMS through BACnet and to AMR/Billing Data Center through Ethernet/LAN port

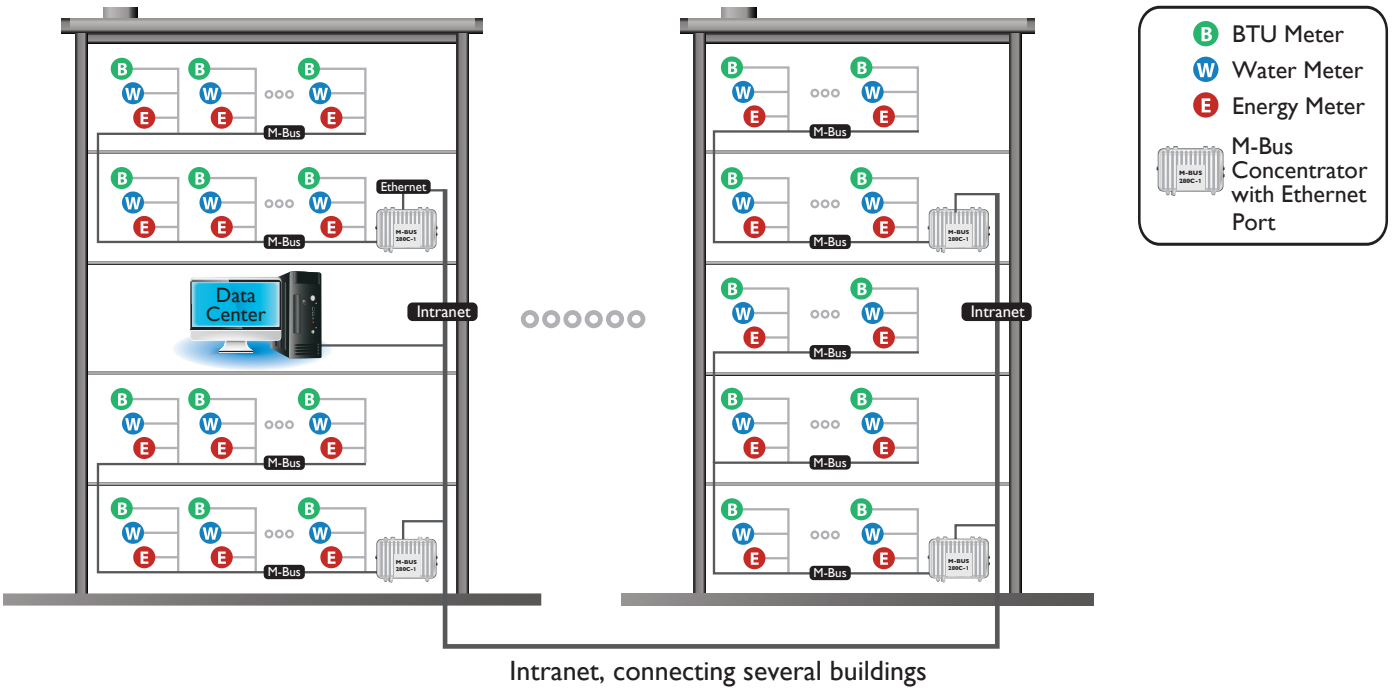




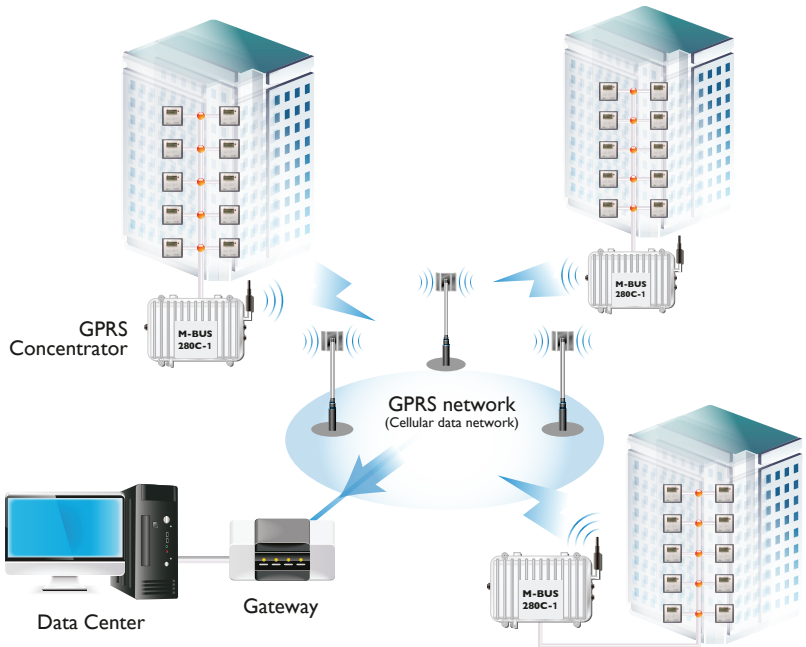
3. A typical AMR system based on MODBUS Concentrator (280C-1-C) with RS485/MODBUS uplink



4. An typical AMR system based on Ethernet Concentrator (280C-1-D) with Ethernet uplink



5. A remote AMR System based on GPRS Concentrator (280C-1-E) with GPRS uplink



For more information on Spire Metering's AMR/AMI solution, please contact solutions@spiremt.com

How To Order

280C – 1 – □ – □ – □□□ – □

Uplink Interface A

M-Bus	**A**
RS232	**B**
RS485 / MODBUS	**C**
Ethernet	**D**
GPRS	**E**
BACnet / IP	**F**

Uplink Interface B (Optional)

None	**A**
RS232	**B**
RS485 / MODBUS	**C**
Ethernet	**D**

Downlink Interface

060	M-Bus. Support 60 slaves
090	M-Bus. Support 90 slaves
120	M-Bus. Support 120 slaves
250	M-Bus. Support 250 slaves

Power Supply

A	90~120VAC (American Plug)
B	220~240VAC (European Plug)
C	Other, please specify

Note:

- *Some of the combinations of the options may not be available. Please refer the below section (MOST POPULAR M-BUS CONCENTRATORS) or email support@spiremt.com for details.*

Most Popular M-Bus Concentrators:

Basic M-Bus Concentrator (RS232 Uplink Only)

280C – 1 – B – A – □□□ – □

Downlink Interface

M-Bus. Support 60 slaves	**060**
M-Bus. Support 120 slaves	**120**
M-Bus. Support 250 slaves	**250**

Power Supply

90~120VAC (American Plug)	**A**
220~240VAC (European Plug)	**B**

Note:

- *Cost-effective M-Bus concentrator, transparent, no protocol translation. No memory card.*

SpireCapture Series 280C-1
Smart M-Bus Concentrator

Modbus Concentrator

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Uplink Interface B (Optional)	
None (default)	A
RS232	B
RS485 / MODBUS	C

Downlink Interface	
M-Bus. Support 60 slaves	060
M-Bus. Support 120 slaves	120
M-Bus. Support 250 slaves	250

Power Supply	
A	90~120VAC (American Plug)
B	220~240VAC (European Plug)

Ethernet Concentrator

280C – 1 – D – □ – □□□ – □

Uplink Interface B (Optional)	
None	A
RS232 (default)	B
RS485 / MODBUS	C

Downlink Interface	
M-Bus. Support 60 slaves	060
M-Bus. Support 120 slaves	120
M-Bus. Support 250 slaves	250

Power Supply	
A	90~120VAC (American Plug)
B	220~240VAC (European Plug)

BACnet Concentrator

280C – 1 – F – □ – 090 – □

Uplink Interface B (Optional)	
None	A
RS232 (default)	B
RS485 / MODBUS	C
Ethernet	D

Power Supply	
A	90~120VAC (American Plug)
B	220~240VAC (European Plug)

Note:

- *BACnet uplink supports BACnet/IP. Downlink supports up to 90 M-Bus slaves only.*

GPRS Concentrator

280C – 1 – E – B – □□□ – □

Downlink Interface	
M-Bus. Support 60 slaves	**060**
M-Bus. Support 120 slaves	**120**
M-Bus. Support 250 slaves	**250**

Power Supply	
A	90~120VAC (American Plug)
B	220~240VAC (European Plug)

Appendix A:

MODBUS Register Table

280C-1 is a smart M-Bus concentrator. It has various uplink options, such as RS485, Ethernet, GPRS, etc. Except the basic M-Bus concentrator 280C-1-B, all the other concentrators support both proprietary protocol (for concentrator configuration, data management and some special functions) and MODBUS protocol.

For MODBUS protocol, function codes 03 and 06 for readingregister and writing to single register have been implemented. Listed below are all the MODBUS registers.

Register Address	# of Registers	Variable Name	Data Type	Notes
0-1	2	Flow Rate	LONG	Lowest bytes in lower reg. Higher bytes in higher reg. Unit: l/h
2-3	2	Flow Total	LONG	Lowest bytes in lower reg. Higher bytes in higher reg. Unit: defined by next register
4	1	Flow Total Unit	INTEGER	0: Liter; 1: m3
5-6	2	Energy Rate	LONG	Lowest bytes in lower reg. Higher bytes in higher reg. Unit: kw
7-8	2	Energy Total	LONG	Lowest bytes in lower reg. Higher bytes in higher reg. Unit: defined by next register
9	1	Energy Total Unit	INTEGER	0: kwh; 1: GJ
10	1	T1 / Supply Temp	INTEGER	x0.01degC
11	1	T2 / Return Temp	INTEGER	x0.01degC
12	1	SN# (lower 4 digits)	BCD	High on left
13	1	SN# (higher 4 digits)	BCD	High on left
14	1	MODBUS ADDR	INTEGER	Writable (saved in flash)
15	1	Meter Type	BCD	xxyy (Hex BCD) xx = AA: mfr identifier for Spire Metering yy = 01: BTU meter = 02: Water Meter = 03: Electricity Meter = 04: Gas Meter
16	1	Comm Mode	INTEGER	Writable. 0: Normal mode (MODBUS) 1-9999 – Transparent mode (the number represents the amount of seconds the mode will stay. Reboot power will reset the mode to Normal)
17	1	Baud Rate	INTEGER	Writable. 0 - 9600/MODBUS (Default) 1- 2400/M-Bus
18	1	Firmware Version	INTEGER	Hex

Appendix B:

BACnet Data Points Table

280C-1-F are smart M-Bus concentrators with BACnet uplink interface. It supports up to 90 M-Bus utility meters. For each meter, there are 16 data points defined in the following table.

Index	Variable Name	Data Type	Notes
1	Flow Rate	Float	Unit: l/h
2	Flow Total	Float	Unit: defined by next register
3	Flow Total Unit	Binary	0: Liter; 1: m3
4	Energy Rate	Float	Unit: kw
5	Energy Total	Float	Unit: defined by next register
9	Energy Total Unit	Binary	0: kwh; 1: GJ
10	T1 / Supply Temp	Float	x0.01degC
11	T2 / Return Temp	Float	x0.01degC
12	SN#_L	Float	Lower 4 digits of SN#
13	SN#_H	Float	Higher 4 digits of SN#
14	MODBUS ADDR	Float	0-255
15	Meter Type	Float	• BTU Meter • Water Meter • Electricity meter • Gas meter

Memo

About Spire Metering Technology

Spire Metering is a global leader in flow and energy management solutions. Through continuous innovation, we transform complex ultrasonic technology into affordable, reliable solutions for accurate flow and energy measurement. Spire Metering offers water, heat, electricity and gas meters as well as AMR/AMI and Billing solutions. Let us help you with your application today.