Intelligent Busway Monitoring Solution for Data Center

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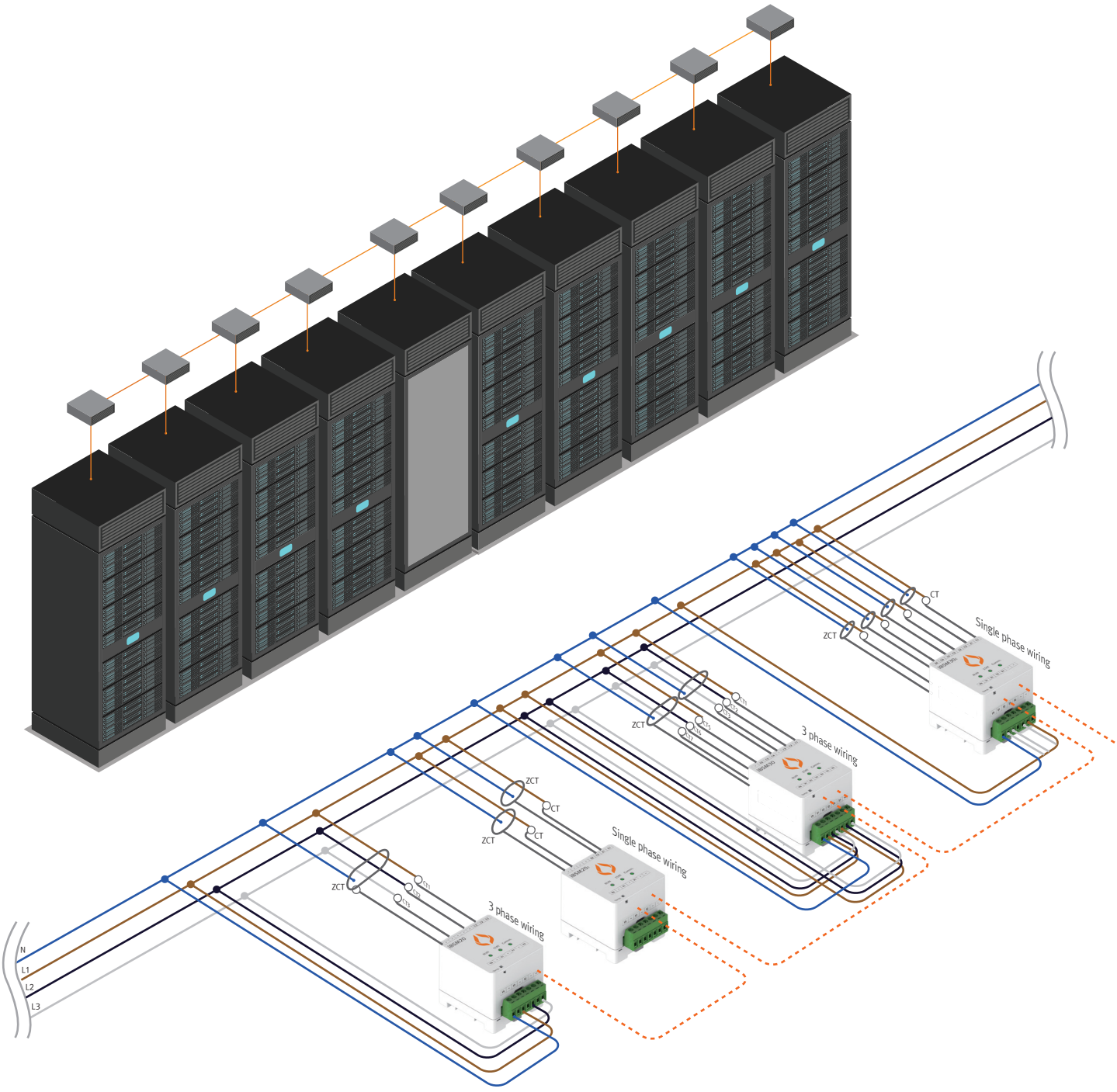
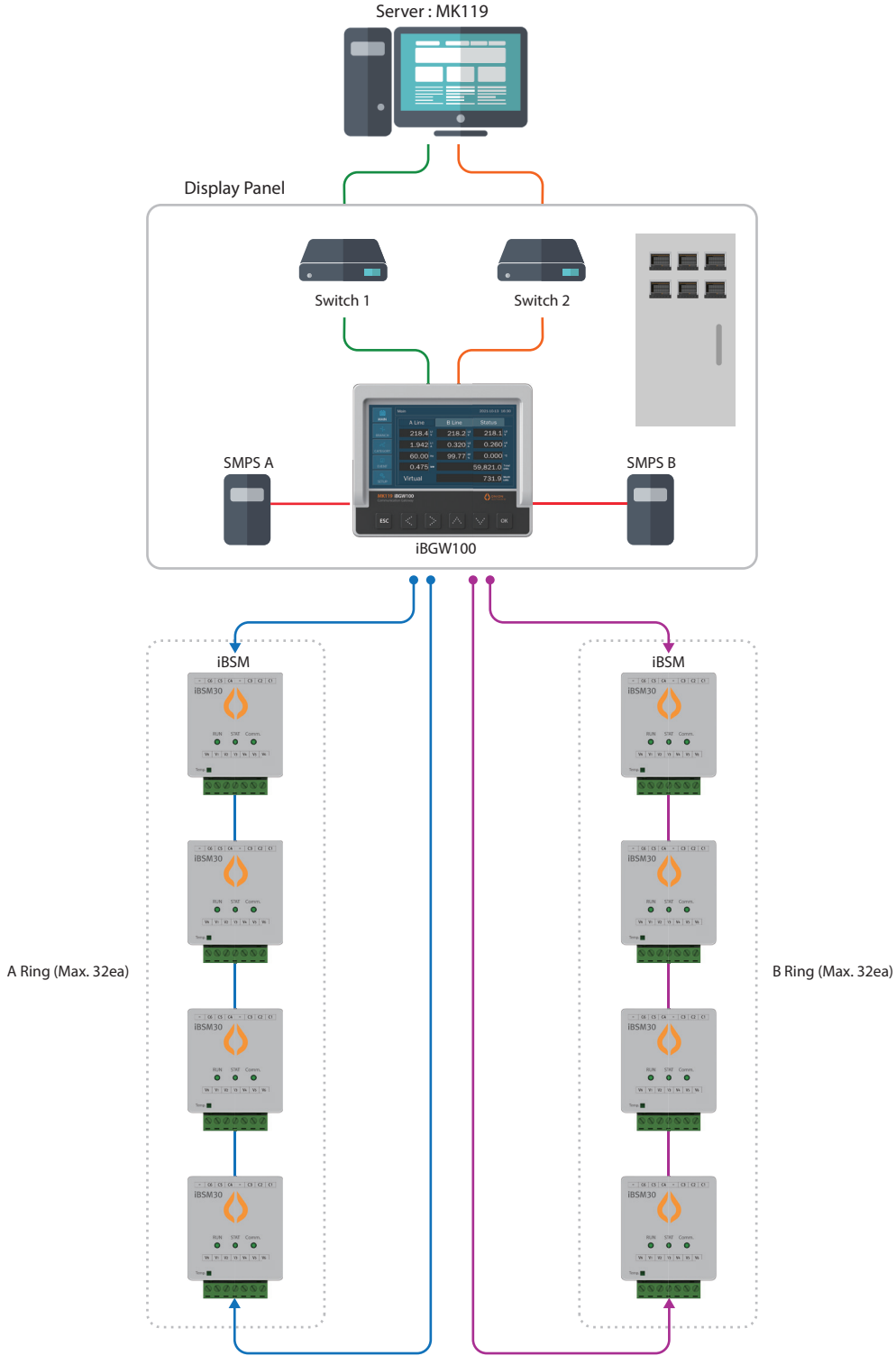
System Layout



Model	Function
iBSM20	Power Meter for Busway Tap Box
iBSM20z	
iBSM30	
iBSM30z	
iBGW100	Busway gateway device

System Overview



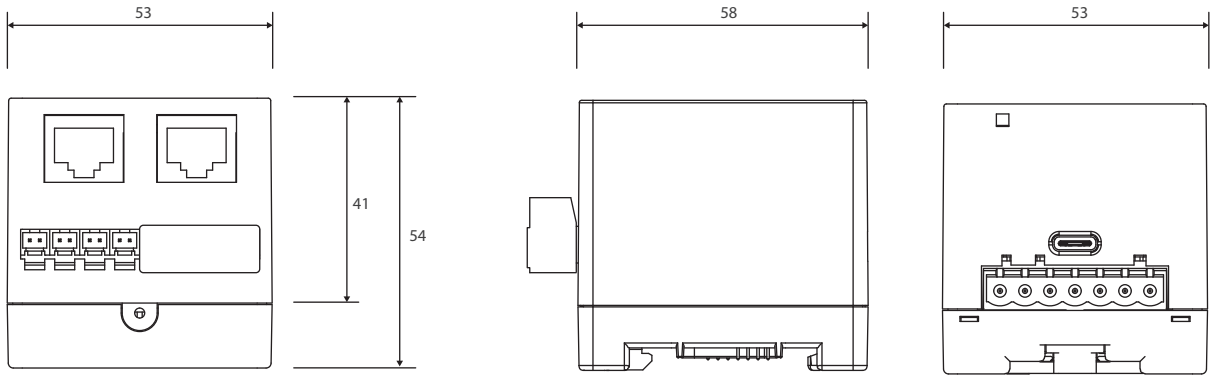
Model	Function	Description
iBSM20	Power Meter for Busway Tap Box	3-phase circuit breaker x 1ea, Earth leakage detector 1ea or single phase circuit breaker x 3 ea
iBSM20z		Single phase circuit breaker x 2ea, Earth leakage detector 2ea
iBSM30		3-phase circuit breaker x 2ea, Earth leakage detector 2ea or single phase circuit breaker x 6 ea
iBSM30z		Single phase circuit breaker x 4ea, Earth leakage detector 4ea
iBGW100	Busway gateway device	Up to 64 iBSM connections are possible

iBSM20

Busway Tap Box Power Meter

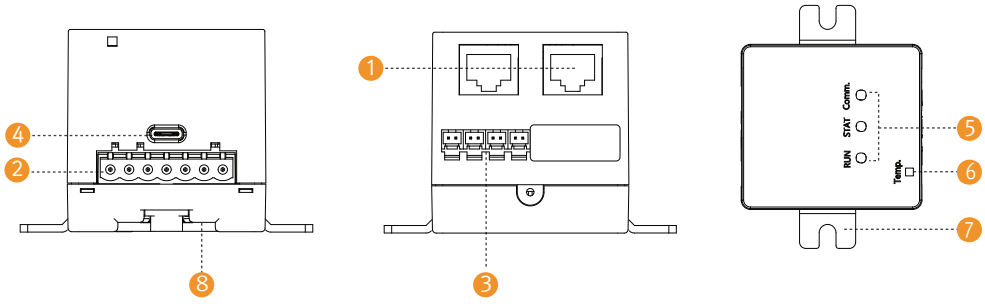
- Measurement elements: phase/line voltage, frequency, line current, active/reactive/apparent power, voltage/current unbalance factor, power factor, active/reactive/apparent energy
- Monitoring on/off and trip status for 3-phase circuit breaker 1ea or single-phase circuit breakers
- Measuring Leakage current
- 0.5 Class precision conforming to IEC62053-22
- Sag/Swell function (minimum 0.5 cycle), trip measurement
- Display reactive power harmonic distortion (THD)
- Built-in temperature sensor: Ambient temperature can be measured
- Support for wall mount and DIN rail installation
- Operating temperature: -10˚C ~ 70˚C
- Storage temperature: -25˚C to 85˚C

Dimension



Operation mode

Mode	power measurement	Leak measurement	Note
3-phase mode	3-phase 1 point	1 point	
Single phase mode	Single phase 3 point	-	



1. Communication port
2. Terminal for power input
3. 1-4 CT terminals: CT connection terminals
4. Upgrade port : Port for firmware upgrade
5. Device status LED : RUN - Blinks during normal operation
   STAT - Blinks quickly during normal measurement
   Comm - Blinks during normal communication
6. Built-in temperature sensor
7. Element for Wall mount (optional)
8. Element for DIN rail

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iBSM20

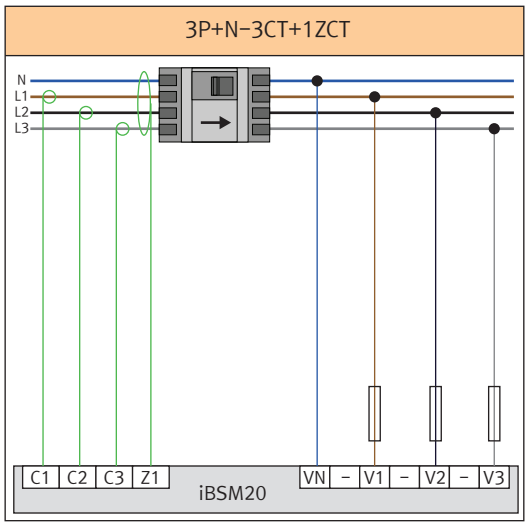
Busway Tap Box Power Meter

Specification

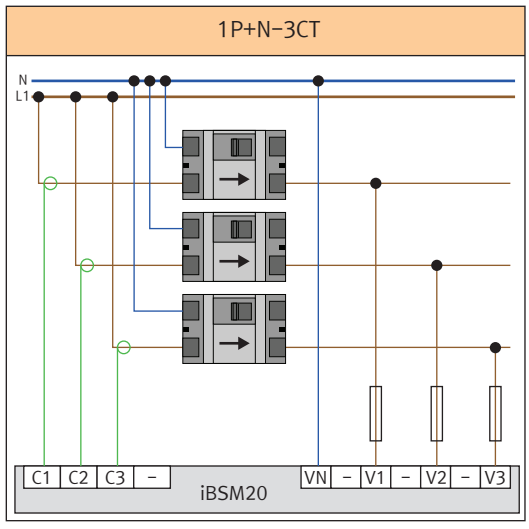
Item		Specification	Note
Connection		3P4W, 1P2W	
Power measurement		3 point	
Leak measurement		1 point	
Operating power		DC power	Supplying DC power integrated with communication cable
Communication method		1Mbps Ringbus	
Measurement	Voltage	Max. 690 V 3~ L-L, 400V L-N	
	Frequency	50/60Hz	
Installation/Temperature		Indoor use, -10˚C ~ 70˚C	
Standard		IEC 62053-21/22	

Parameter		Measuring range	Accuracy
Voltage	phase voltage	0.0 ~ 400V	±0.2% Reading
	line voltage	0.0 ~ 690V	±0.2% Reading
Current	Ia, Ib, Ic	0.000 ~ 1000A	±0.2% Reading
Power	Active	0.000 ~ ±9999kW	
	Reactive	0.000 ~ ±9999kVar	
	Apparent	0.000 ~ 9999kVA	
Energy	Active	0 ~ ±999,999,999kWh	IEC62053-22 Class 0.5S
	Reactive	0 ~ ±999,999,999kVarh	
	Apparent	0 ~ 999,999,999kVah	
Frequency	Hz	45~65Hz	±0.2% Reading
Power factor	%	0.000 ~ 1.000LEAD/LAG	±0.5% Full scale
THD	Voltage	0.0 ~ 999.9%	±0.5% Full scale
	Current	0.0 ~ 999.9%	±0.5% Full scale
TDD	Current	0.0 ~ 999.9%	±0.5% Full scale
Unbalance	Voltage	0.0 ~ 100.00 %	
	Current	0.0 ~ 100.00 %	
Sag/Swell	%	Min. 1/2 cycle	Event
Breaker monitoring	On/Off, Trip	Max. 3 point	Event
Temperature	Internal temperature	-40˚C ~ 125˚C	

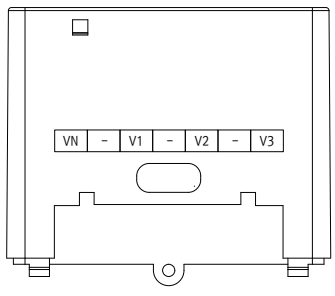
Installation example



3-phase 4-wire wiring diagram(ZCT)



Single-phase wiring diagram



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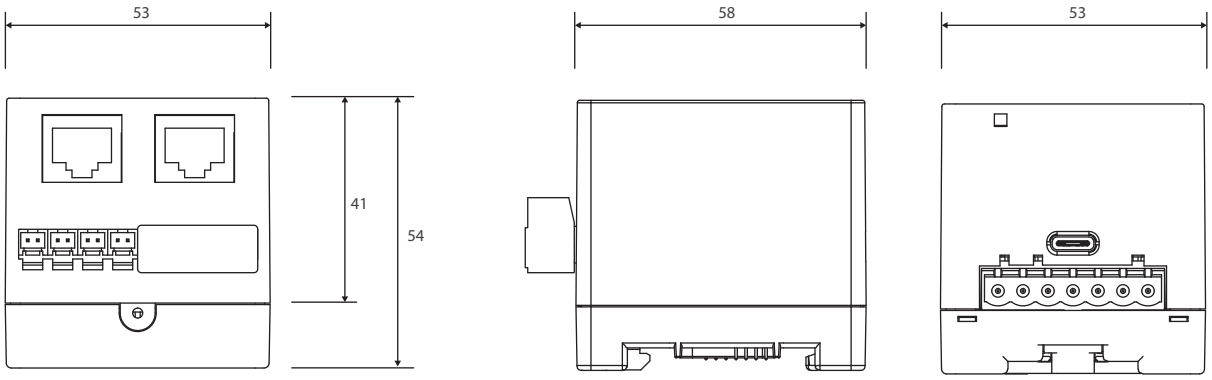
iBSM20z

Busway Tap Box Power Meter

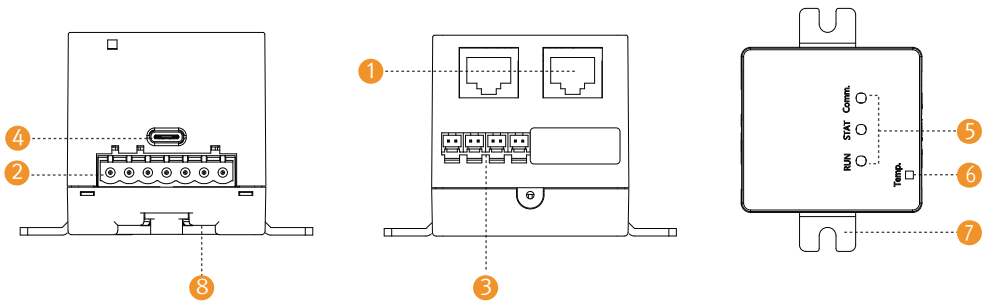
- Measurement elements: phase/line voltage, frequency, line current, active/reactive/apparent power, voltage/current unbalance factor, power factor, active/reactive/apparent energy
- Monitoring on/off and trip status for two single-phase circuit breakers
- Measuring Leakage current
- 0.5 Class precision conforming to IEC62053-22
- Sag/Swell function (minimum 0.5 cycle), trip measurement
- Display reactive power harmonic distortion (THD)
- Built-in temperature sensor: Ambient temperature can be measured
- Support for wall mount and DIN rail installation
- Operating temperature: -10˚C ~ 70˚C
- Storage temperature: -25˚C to 85˚C

Dimension



Operation mode

Mode	Power measurement	Leak Measurement	Note
Single phase	Single phase 2 point	2 point	



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5. Device status LED : RUN – Blinks during normal operation
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6. Built-in temperature sensor
7. Element for Wall mount (optional)
8. Element for DIN rail

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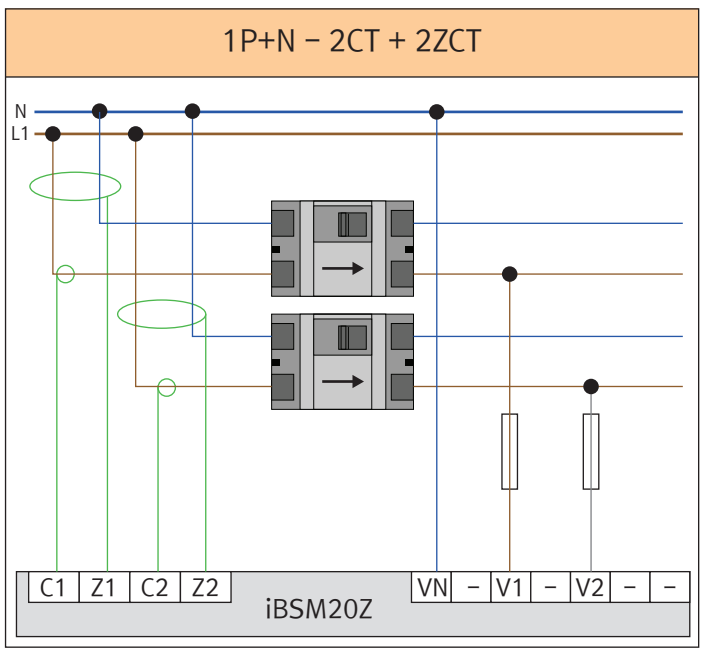
Busway Tap Box Power Meter

Specification

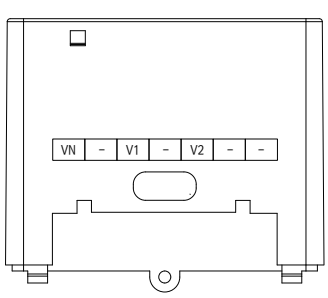
Item		Specification	Note
Connection		1P2W	
Power measurement		2 point	
Leak measurement		2 point	
Operating power		DC power	Supplying DC power integrated with communication cable
Communication method		1Mbps Ringbus	
Measurement	Voltage	Max. 690 V 3~ L-L, 400V L-N	
	Frequency	50/60Hz	
Installation/Temperature		Indoor use, -10˚C ~ 70˚C	
Standard		IEC 62053-21/22	

Parameter		Measuring range	Accuracy
Voltage	phase voltage	0.0 ~ 400V	±0.2% Reading
	line voltage	0.0 ~ 690V	±0.2% Reading
Current	Ia, Ib, Ic	0.000 ~ 1000A	±0.2% Reading
Power	Active	0.000 ~ ±9999kW	
	Reactive	0.000 ~ ±9999kVar	
	Apparent	0.000 ~ 9999kVA	
Energy	Active	0 ~ ±999,999,999kWh	IEC62053-22 Class 0.5S
	Reactive	0 ~ ±999,999,999kVarh	
	Apparent	0 ~ 999,999,999kVah	
Frequency	Hz	45~65Hz	±0.2% Reading
Power factor	%	0.000 ~ 1.000LEAD/LAG	±0.5% Full scale
THD	Voltage	0.0 ~ 999.9%	±0.5% Full scale
	Current	0.0 ~ 999.9%	±0.5% Full scale
TDD	Current	0.0 ~ 999.9%	±0.5% Full scale
Unbalance	Voltage	0.0 ~ 100.00 %	
	Current	0.0 ~ 100.00 %	
Sag/Swell	%	Min. 1/2 cycle	Event
breaker monitoring	On/Off, Trip	Max. 2 point	Event
Temperature	Internal temperature	-40˚C ~ 125˚C	

Installation example



single-phase wiring diagram (ZCT)



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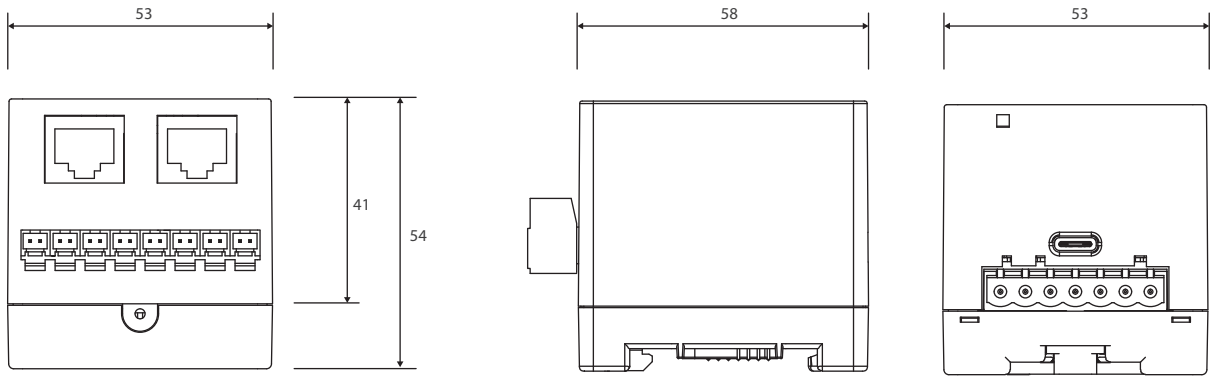
iBSM30

Busway Tap Box Power Meter

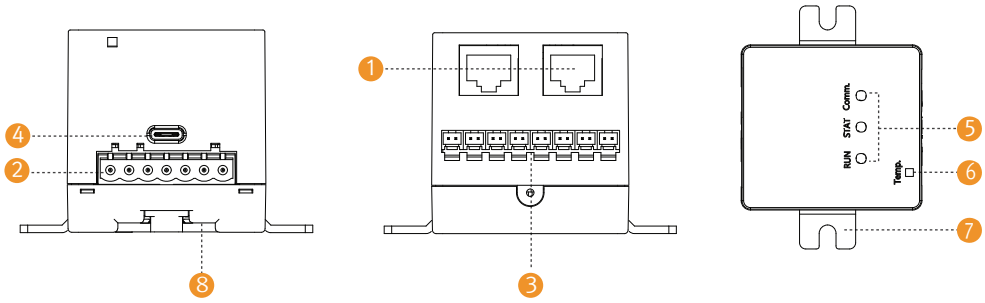
- Measurement elements: phase/line voltage, frequency, line current, active/reactive/apparent power, voltage/current unbalance factor, power factor, active/reactive/apparent energy
- Monitoring on/off and trip status for two 3-phase circuit breakers or six single phase ciircuit breaker
- Measuring Leakage current
- 0.5 Class precision conforming to IEC62053-22
- Sag/Swell function (minimum 0.5 cycle), trip measurement
- Display reactive power harmonic distortion (THD)
- Built-in temperature sensor: Ambient temperature can be measured
- Support for wall mount and DIN rail installation

Dimension



Operation mode

Mode	Power measurement	Leak measurement	Note
3-phase mode	3-phase 2point	2 point	
Single phase mode	Single phase 6point	-	



1. Communication port
2. Terminal for power input
3. 1-8 CT terminals: CT connection terminals
4. Upgrade port : Port for firmware upgrade
5. Device status LED : RUN - Blinks during normal operation
   STAT - Blinks quickly during normal measurement
   Comm - Blinks during normal communication
6. Built-in temperature sensor
7. Element for Wall mount (optional)
8. Element for DIN rail

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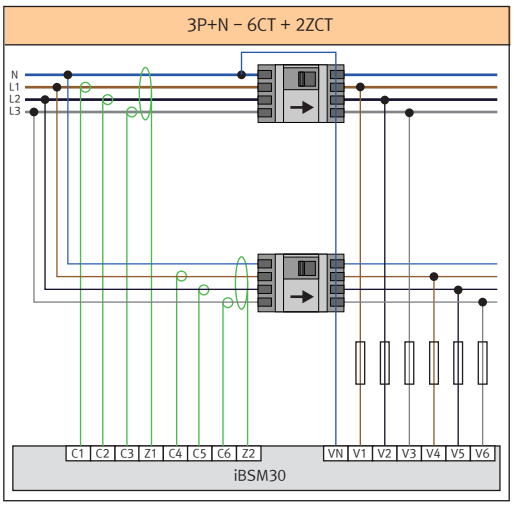
Busway Tap Box Power Meter

Specification

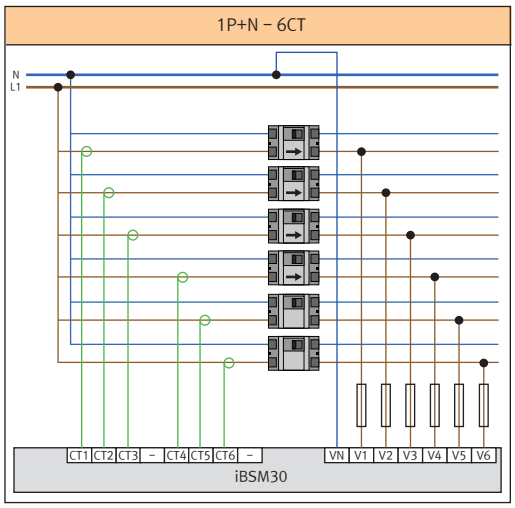
Item		Specification	Note
Connection		3P4W, 1P2W	
Power measurement		6 point	
Leak measurement		2 point	
Operating power		DC power	Supplying DC power integrated with communication cable
Communication method		1Mbps Ringbus	
Measurement	Voltage	Max. 510 V 3~ L-L, 3000V L-N	
	Frequency	50/60Hz	
Installation/Temperature		Indoor use, -10˚C ~ 70˚C	
Standard		IEC 62053-21/22	

Parameter		Measuring range	Accuracy
Voltage	phase voltage	0.0 ~ 300V	±0.2% Reading
	line voltage	0.0 ~ 510V	±0.2% Reading
Current	I_a, I_b, I_c	0.000 ~ 1000A	±0.2% Reading
Power	Active	0.000 ~ ±9999kW	
	Reactive	0.000 ~ ±9999kVar	
	Apparent	0.000 ~ 9999kVA	
Energy	Active	0 ~ ±999,999,999kWh	IEC62053-22 Class 0.5S
	Reactive	0 ~ ±999,999,999kVarh	
	Apparent	0 ~ 999,999,999kVah	
Frequency	Hz	45~65Hz	±0.2% Reading
Power factor	%	0.000 ~ 1.000LEAD/LAG	±0.5% Full scale
THD	Voltage	0.0 ~ 999.9%	±0.5% Full scale
	Current	0.0 ~ 999.9%	±0.5% Full scale
TDD	Current	0.0 ~ 999.9%	±0.5% Full scale
Unbalance	Voltage	0.0 ~ 100.00 %	
	Current	0.0 ~ 100.00 %	
Sag/Swell	%	Min. 1/2 cycle	Event
Breaker monitoring	On/Off, Trip	Max. 6 point	Event
Temperature	Internal temperature	-40˚C ~ 125˚C	

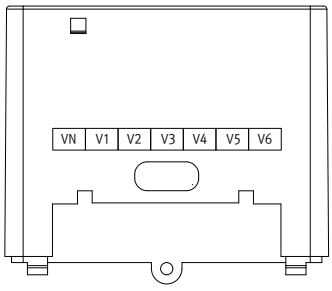
Installation example



3-phase 4-wire wiring diagram(ZCT)



Single-phase wiring diagram



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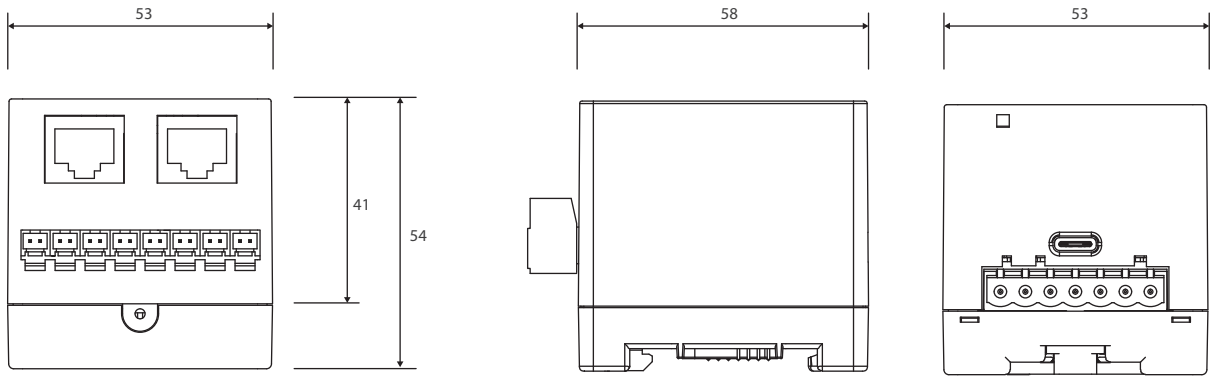
iBSM30z

Busway Tap Box Power Meter

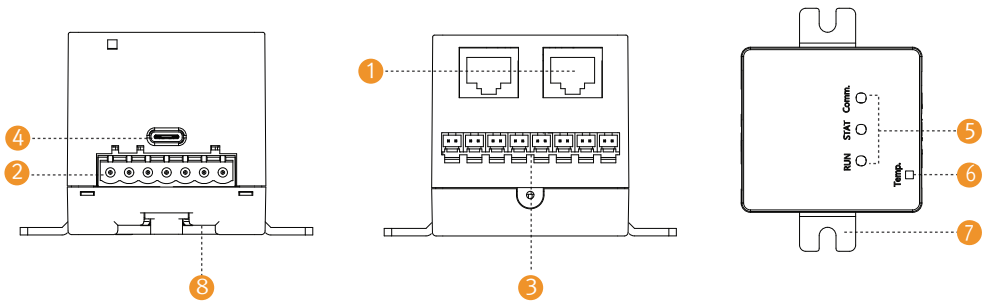
- Measurement elements: phase/line voltage, frequency, line current, active/reactive/apparent power, voltage/current unbalance factor, power factor, active/reactive/apparent energy
- Monitoring on/off and trip status for six single phase ciircuit breaker
- Measuring Leakage current
- 0.5 Class precision conforming to IEC62053-22
- Sag/Swell function (minimum 0.5 cycle), trip measurement
- Display reactive power harmonic distortion (THD)
- Built-in temperature sensor: Ambient temperature can be measured
- Support for wall mount and DIN rail installation

Dimension



Operation mode

Mode	Power measurement	leak measurement	Note
Single phase mode	Single phase 4point	4 point	



1. Communication port
2. Terminal for power input
3. 1-8 CT terminals: CT connection terminals
4. Upgrade port : Port for firmware upgrade
5. Device status LED : RUN – Blinks during normal operation
   STAT – Blinks quickly during normal measurement
   Comm – Blinks during normal communication
6. Built-in temperature sensor
7. Element for Wall mount (optional)
8. Element for DIN rail

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iBSM30z

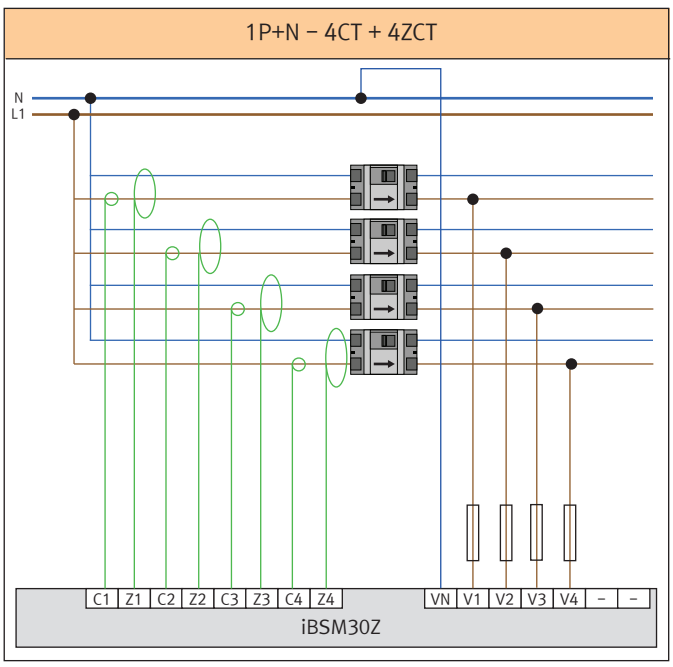
Busway Tap Box Power Meter

Specification

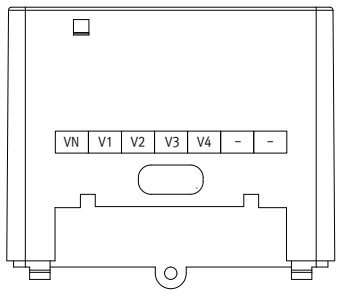
Item		Specification	Note
Connection		1P2W	
Power measurement		4 point	
Leak measurement		4 point	
Operating power		DC power	Supplying DC power integrated with communication cable
Communication method		1Mbps Ringbus	
Measurement	Voltage	Max. 510 V 3~ L-L, 3000V L-N	
	Frequency	50/60Hz	
Installation/Temperature		Indoor use, -10˚C ~ 70˚C	
Standard		IEC 62053-21/22	

Parameter		Measuring range	Accuracy
Voltage	phase voltage	0.0 ~ 300V	±0.2% Reading
	line voltage	0.0 ~ 510V	±0.2% Reading
Current	I_a, I_b, I_c	0.000 ~ 1000A	±0.2% Reading
Power	Active	0.000 ~ ±9999kW	
	Reactive	0.000 ~ ±9999kVar	
	Apparent	0.000 ~ 9999kVA	
Energy	Active	0 ~ ±999,999,999kWh	IEC62053-22 Class 0.5S
	Reactive	0 ~ ±999,999,999kVarh	
	Apparent	0 ~ 999,999,999kVah	
Frequency	Hz	45~65Hz	±0.2% Reading
Power factor	%	0.000 ~ 1.000LEAD/LAG	±0.5% Full scale
THD	Voltage	0.0 ~ 999.9%	±0.5% Full scale
	Current	0.0 ~ 999.9%	±0.5% Full scale
TDD	Current	0.0 ~ 999.9%	±0.5% Full scale
Unbalance	Voltage	0.0 ~ 100.00 %	
	Current	0.0 ~ 100.00 %	
Sag/Swell	%	Min. 1/2 cycle	Event
Breaker monitoring	On/Off, Trip	Max. 6 point	Event
Temperature	Internal temperature	-40˚C ~ 125˚C	

Installation example



single-phase wiring diagram (ZCT)



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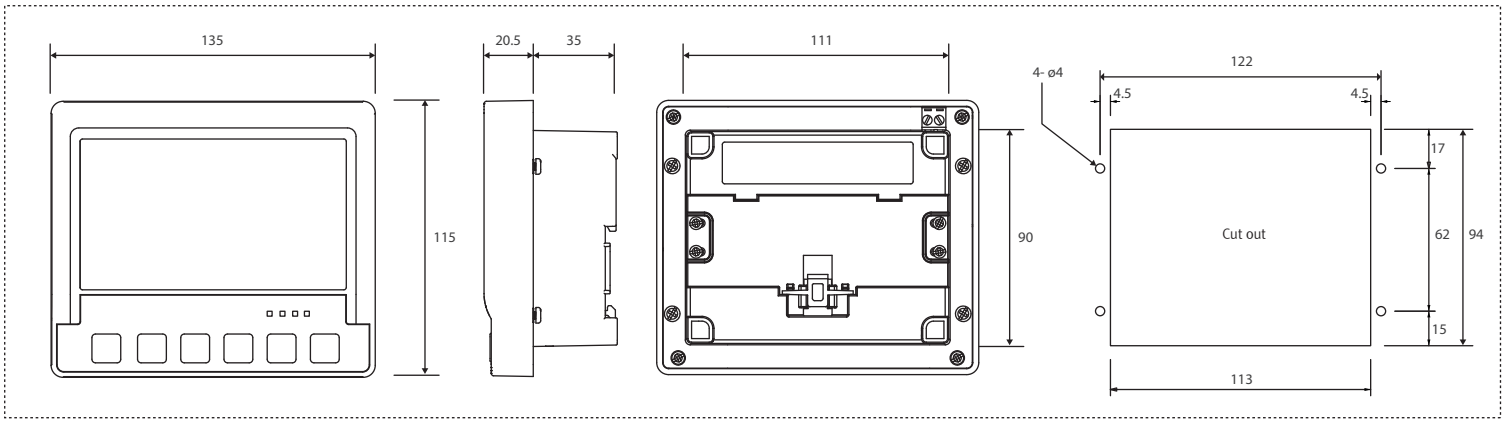
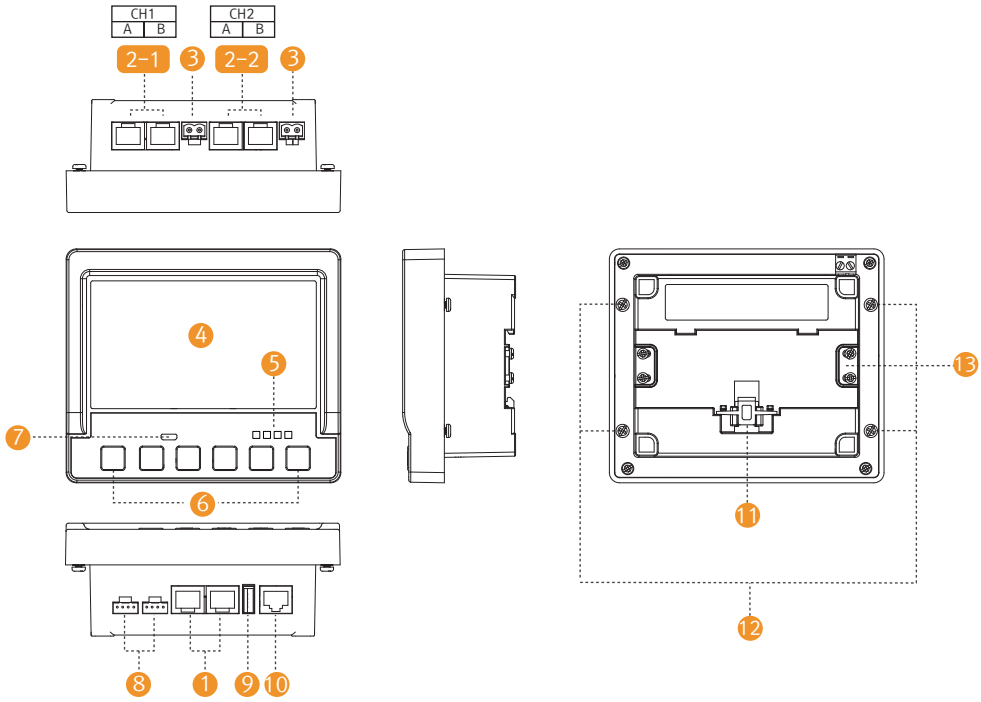
iBGW100

Communication gateways

- Search and sort function for connected devices
- Connect up to 64 iBSM devices into one system
- Communication with iBSM: Provides communication and operation power with one cable, Ringbus Communication, max. 1Mbps
- Communication with host: Ethernet communication based on Modbus TCP (2 ports of LAN redundancy)
- Power redundancy support
- High-definition 5” TFT LCD
- Support for panel mount and DIN rail installation





1. Communication port 1 for host : LAN port 1 (1st IP, 2port switch built-in)
2-1. Communication port 1 for slave : 2 port (A/B, ring structure), ID #1~#32
2-2. communication port 2 for slave: 2 port (A/B, ring structure), ID #33~#64
3. Power port: DC input terminal (24V)
4. LCD Display : 5” Color TFT LCD
5. Device status LED
6. KEY : 6 keys for controlling
7. USB port: firmware upgrade
8. RS485 terminal Modbus Master / Slave
9. USB Port
10. Communication port 2 for host : LAN port 2 (2nd IP)
11. DIN rail
12. Bolt for panel mount
13. Element for wall mount (optional)

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Specification

Item	Specification
Operating power	24V DC
Communication	Uplink : 100MBps Ethernet, Modbus/TCP, 2 port Downlink : 1Mbps Ringbus, 2 port
Operating temperature	-10℃~55℃
Storage temperature	-25˚C ~ 85˚C

Installation example

iBSM connection example (iBGW redundancy, max. 64 connections, ring bus connection, power redundancy, server dual LAN)