IPL

Router - Firewall

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USER GUIDE

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The IPL Industrial Router family is manufactured by

ETIC TELECOM
13 Chemin du vieux chêne
38240 MEYLAN
FRANCE

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UE DECLARATION OF CONFORMITY

The manufacturer, ETIC Telecom – 13 chemin du vieux chêne – 38240 Meylan – France, Hereby declares under sole responsibility that the listed devices conform to
- the Radio Equipment Directive (RED) 2014/53/UE,
- the Restriction of the use of certain Hazardous Substances (RoHS) Directive 2011/65/UE.

Type of device: IP router
Models:
IPL-C-100, IPL-E-100, IPL-EW-100,
IPL-E-400, IPL-E-2XX, IPL-EW-400, IPL-EW-2XX,
IPL-A-400, IPL-A-2XX, IPL-AW-400, IPL-AW-2XX,
IPL-C-400, IPL-C-2XX, IPL-CW-400, IPL-CW-2XX,
IPL-DAC-400, IPL-DEC-400, IPL-DAE-400,

The harmonized standards to which these devices comply are:

Standard	Title
EN 61000-6-2 2006	Immunity: EN61000-4-2 Electrostatic Discharge EN61000-4-3 RF Radiated Immunity EN61000-4-4 EFT/Burst Immunity EN61000-4-5 Surge Immunity EN61000-4-6 RF Conducted Immunity EN61000-4-8 Power Frequency Magnetic Field Immunity
EN 61000-6-4 2007 A1/2011	Emission: EN55032 Radiated and conducted emission
EN 301 489-1 V1.9.2 EN 301 489-3 V1.6.1 EN 301 489-7 V1.3.1 EN 301 489-17 V2.2.1 EN 301 489-24 V1.5.1	Radio - EMC
EN 301 511 V9.0.2 EN 301 908-1 V6.2.1 EN 301 908-2 V6.2.1 EN 300 328 V1.9.1 EN 301893 V1.8.1	Radio - Spectrum
EN 62368-1 2014 EN 62311 2008	Safety and Health

Date: 7th February 2019

Philippe Duchesne
Technical Director

FCC/IC Regulatory notices (IPL-X-100 models)

This device complies with Part 15 of the FCC. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution: ETIC Telecom has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user's authority to operate the equipment.

TABLE DES MATIERES

OVERVIEW

1	Purpose of this manual

The present user guide describes the features and the installation of the IPL Industrial Router family.

In the rest of the document the term "SIG" is used to designate the product.

2	Products Identification

This family of Industrial Router consists of these models:
IPL-C-100, IPL-E-100, IPL-EW-100
IPL-E-400, IPL-E-2XX, IPL-EW-400, IPL-EW-2XX,
IPL-A-400, IPL-A-2XX, IPL-AW-400, IPL-AW-2XX,
IPL-C-400, IPL-C-2XX, IPL-CW-400, IPL-CW-2XX,
IPL-DAC-400, IPL-DEC-400, IPL-DAE-400,

The main features are summarized below:

Models																		
IPL-	C-100	E-100	EW-100	E-400	E-2XX	EW-400	EW-2XX	A-400	A-2XX	AW-400	AW-2XX	C-400	C-2XX	CW-400	CW-2XX	DAC-400	DEC-400	DAE-400
WAN Ethernet		•	•	•	•	•	•										•	•
WAN ADSL								•	•	•	•					•		•
WAN Cellular (-HG, -HW : 3G+, -LE : 4G))	•											•	•	•	•	•	•	
Wi-Fi 2.4 & 5 GHz			•			•	•			•	•			•	•			
LAN Ethernet 10-100 Mb/s	1	1	1	4	2	4	2	4	2	4	2	4	2	4	2	4	4	4
Serial link RS232 /RS485…				•		•		•		•		•		•				
USB				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Link redundancy																•	•	•
2 power inputs				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Power supply VDC	12-24	12-24	12-24	12-48	12-48	12-48	12-48	12-48	12-48	12-48	12-48	12-48	12-48	12-48	12-48	12-48	12-48	12-48
2 SIM readers												•	•	•	•	•	•	
Digital input				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Digital output				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

OVERVIEW

Models with serial interface code:

xx	RS232	RS485	RS422 isolated	RS485 isolated
20	1	1	0	0
30	2	0	0	0
60	0	0	1	0
61	0	0	0	1

In the remainder of this document the term IPL-X is used indifferently for   IPL-C, IPL-E, IPL-EW, IPL-A, IPL-AW and IPL-CW.

3   Specifications

General characteristics	
Dimensions	IPL-X-100: 120 x 37 x 88 mm (h,w,d) Other IPL: 135 x 47 x 115 mm (h,w,d)
Weight	Max 0.65 kg
Casing	Metallic IPL- X-100: IP41 – IEC60529 Other IPL: IP20 – IEC60529 DIN rail mounting
Temperature	Non-operating: -40°/ + 85°C Operating: -20°/ +70°C
Humidity	5 to 95 % relative (non-condensing)
Power supply	Protected against reverse polarity IPL-X-100: Nominal: 12-24 VDC (min 10 VDC - max 30 VDC) Other IPL: Nominal: 12-48 VDC (min 10 VDC - max 60 VDC) 2 points Phoenix connector
Consumption	IPL-E : 2W IPL-A, IPL-C and IPL-EW : 5W IPL-AW, IPL-CW, IPL-DAC : 8W

EMC	Immunity EN61000-6-2:
	     EN61000-4-2 : ESD : 4 kV contact – 8kV air
	     EN61000-4-3 : RF - radiated: 10V/m < 2 GHz
	     EN61000-4-4 : Burst
	     EN61000-4-5 : Surge : 4KV line / earth
	     EN61000-4-6 : RF - conducted
	     EN61000-4-8 : Magnetic fields
	 Emission EN61000-6-4:
	     EN 55032: RF - conducted and radiated
	 FCC:
	     IPL-X-100 : FCC Part 15

Electrical safety	IEC/EN 62368-1 IPL-X-100 : CB FR_704843
Hazardous substances	2011/65/UE (RoHS) REACH

OVERVIEW

WAN network	
Ethernet	RJ45 Auto : 10/100 full & half duplex MDI/MDI-X
ADSL	ADSL2+ and RE-ADSL ITU G992.5 (ADSL2+ and Reach Extended ADSL) Max data rate : UL : 1 Mbps, DL : 24 Mbps PPPoE : PPP over Ethernet PPPoA : PPP over ATM EoA : Ethernet over ATM RFC2684 Bridged IPoA : Routed IP over ATM, RFC2684 Routed

4G/3G+	-LE : 4G LTE Europe
	    LTE bands: B1, B2, B3, B4, B5, B7, B8, B20
	    UMTS bands: B1, B2, B5, B8
	    GSM bands: 850/900/1800/1900
	-CH : 4G LTE China
	    LTE bands: B1, B3, B8, B38, B39, B40, B41
	    UMTS bands: B1, B5, B8, B9
	    GSM bands: 900/1800
	-HG : 3G+ HSPA worldwide (except. North America)
	    UMTS bands: B1, B2, B5, B8
	    GSM bands: 850/900/1800/1900
	-HW : 3G+ HSPA worldwide
	    UMTS bands: B1, B2, B4, B5, B6, B8, B19
	    GSM bands: 850/900/1800/1900
	
	Max data rate 4G: UL @ 50 Mbps and DL @ 100Mbps
	Max data rate 3G+: UL @ 5,7 Mbps and DL @ 21 Mbps
	Max data rate 2G: UL @ 237 Kbps and DL @ 237 Kbps
	Antenna connector female SMA

Wi-Fi	Client 2,4 and 5 GHz 802.11 a/b/g/n Antenna connector female RP-SMA

LAN network	
Ethernet	RJ45: 1 to 4 ports depending on model Auto: 10/100 full & half duplex MDI/MDI-X
Wi-Fi	Access point 2,4 and 5 GHz 802.11 a/b/g/n Antenna connector female RP-SMA

Routing / @IP	
IP Routing	Routing tables Static routes RIP or OSPF Address translation (DNAT, SNAT, NAT 1:1)
IP@ assignment	WAN interface: DHCP client or fixed IP LAN interface: DHCP server
DNS	WAN interface: compatible with DYNDNS, No-IP or ETIC DNS LAN interface: relay & server
Redundancy	VRRP RFC 3768 protocol Multi WAN for backup on some IPL models

Security	
VPN tunnel	OpenVPN (TLS/SSL), IPSEC, L2TP/IPSEC, PPTP Shared key or X509 certificate Encryption 3DES & AES 128-192-256 Authentication: MD5 & SHA-1 Up to 10 VPN tunnels (mix OpenVPN IPSEC allowed)
Firewall	Stateful packet inspection (SPI: 50 rules) IP@ and ports filtering
Remote access	Up to 25 remote users RAS access: Login & Password and Certificate (optional) Customizable LAN machine network access rights
Log	Timestamped Events: connection, restart, alarms
Alarms	Digital input: email, SMS, SNMP trap Digital output: Power supply failure, user connection…

Serial gateways	
Gateways	Raw TCP client Raw TCP server Raw UDP Raw Multicast ModBus TCP client to Modbus RTU/ASCII slave (for master PLC) Modbus TCP server to Modbus RTU/ASCII master (for slave PLC) Telway/XIP to Unitelway slave (for master PLC) Telnet RFC 2217
RS232/RS485	Data rate : 1200 to 115200 kb/s, 10 or 11 bits, parity N / E / O RS232 : RJ45 RS485 : 2 points Phoenix connector
USB	1 port USB host PPP client

Misc.	

SNMP	Supported MIBs:
	   RFC1213-MIB (MIB-2)
	   ADSL-LINE-MIB
	   ETIC-TELECOM-MIB-1
	SNMP traps

Configuration	Web server
Management	Save and restore configurations Reset product to return to factory configuration

4   Product overview

The IPL is both a router, a firewall and a remote access server.

It is designed to connect industrial machines on an intranet or the Internet with a high level of security.

It provides depending on model :
IPL-E : A WAN Ethernet interface
IPL-A : An ADSL modem
IPL-C : A 3G/4G cellular modem
IPL-DAE : An ADSL modem and a WAN Ethernet
IPL-DAC : An ADSL modem and a 3G/4G cellular modem
IPL-DEC : A WAN Ethernet interface and a 3G/4G cellular modem

It offers the following functions:
IP router : Routing table, RIP, SNMP, VRRP.
VPN vlient and server VPN : IPSec or OpenVPN.
Remote access service for remote maintenance or operation with PC, tablet or smartphone.
Firewall SPI
Automatic backup of an ADSL link over the cellular network (IPL-DAC)
Automatic backup of a private VPN network over the cellular network (IPL-DEC)
Serial interface and Wi-Fi : optional

4.1   Applications

Remote SCADA system
The IPL is designed to connect industrial machines on an intranet or the Internet with a high level of security.
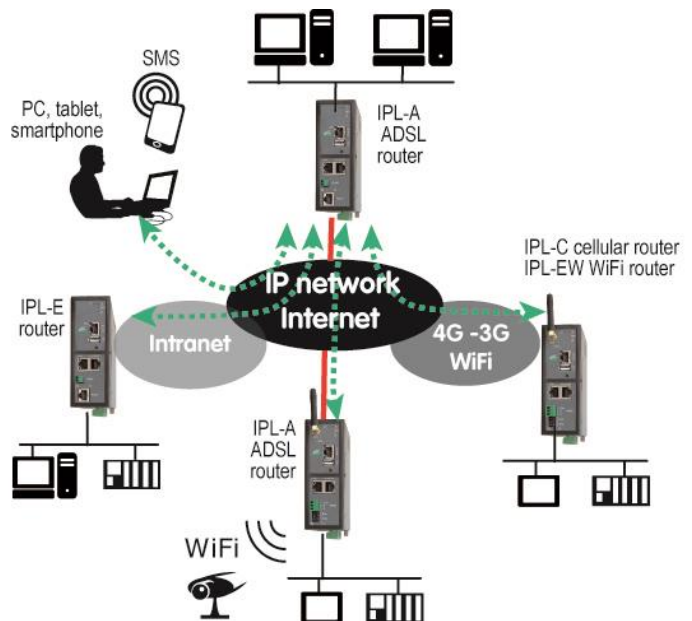
High availability SCADA system with an IPL-DAC.
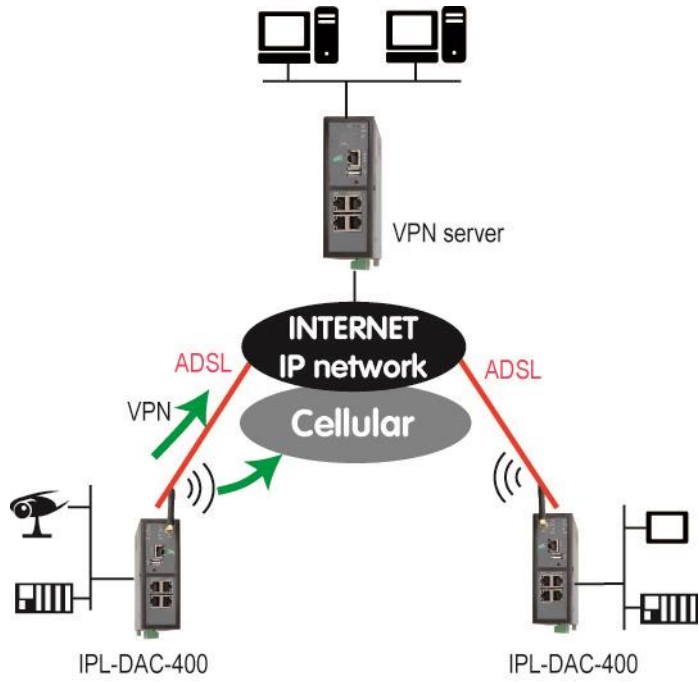
Remote access server for remote operation
A remote user can connect to any device in the system using a PC, tablet or a smartphone.
His access rights may be limited according to his identity.

Traffic filtering (Firewall)

OVERVIEW

4.2   IPL functions

IP router

The IPL provides powerful, flexible and comprehensive solutions to route IP packets from one network to other networks:

Static routes, to reach nested networks,

Network address translation d'adresse (NAT, DNAT, port forwarding),

Routing protocol (RIP),

Domain name management DNS et DynDNS.

IPSec & OpenVPN tunnels

The IPL features IPSec and OpenVPN tunnels to provide a high level of security and also compatibility with existing devices.

The VPN connection guarantees a high level of performance and security

Transparency: The VPN interconnects the two networks so that any machine in one network can communicate with a machine on the other network.

Authentication: The router that establishes the VPN is authenticated by the one that accepts it and any other connection is rejected.

Confidentiality: Data traffic via the VPN is encrypted.

IPSec will be chosen when the IPL needs to establish a VPN with an already installed IPSec VPN server. OpenVPN will be preferred when VPN traffic is routed through intermediate routers to take advantage of the flexibility of this technique.

Remote access server for PCs, tablets and smartphones

The IPL can also behave like a remote access server.

If he is registered in the user list, a remote user can access to particular devices of a machine network depending on his identity.

The new HTTPS portal make possible to access easily and safely to HMIs or PLCS web servers using a tablet, a PC or a smartphone.

Firewall

The firewall protects against the sophisticated attacks coming from the Internet

It is also able to filter IP frames between the WAN interface or any VPN interface on one hand, and the LAN interface on the other hand.

VRRP redundancy

VRRP makes possible to use two routers shaping a redundant solution.

Automatic backup of an ADSL link over the cellular network

The IPL-DAC provides an ADSL interface and a cellular interface. It is designed for critical industrial remote SCADA systems.

In normal situation the data are transmitted via the main interface (usually the ADSL one).

In case of a failure the data are transmitted via the backup interface (usually the cellular one).

Automatic backup of a private VPN network over the cellular network
The IPL-DEC provides a WAN Ethernet interface and a cellular interface. It is designed for critical industrial remote SCADA systems.
In normal situation the data are transmitted via the main interface (usually the WAN Ethernet).
In case of a failure the data are transmitted via the backup interface (usually the cellular one).

Wi-Fi interface (optional)
The IPL can be equipped with a Wi-Fi 2.4 and 5GHz interface able to behave like a client or an access point.

SNMP
The IPL is an SNMP agent; it complies with the MIB2 standard and transmits an SNMP trap when configurable events occur.

DNS server
DNS makes it possible to assign Internet names to devices or organizations independently of their public IP address.
The IPL behaves like a DNS server for the devices connected to the LAN.

DHCP server
On the LAN interface, the IPL can behave like a DHCP server.

Configuration
The IPL is configured using an HTML browser (HTTP or HTTPS).

EticFinder
The ETICFinder software can easily detect all ETIC branded products connected to an Ethernet network to display their MAC address and their IP address.

Serial gateway
Optionally, the IPL provides 1 or 2 serial RS232, RS485, RS422 interfaces.
The serial gateway features the following modes :
    Raw TCP client or server
    Raw UDP
    Telnet
    Modbus master or slave
    Unitelway

INSTALLATION

1   Description

1.1   Dimensions

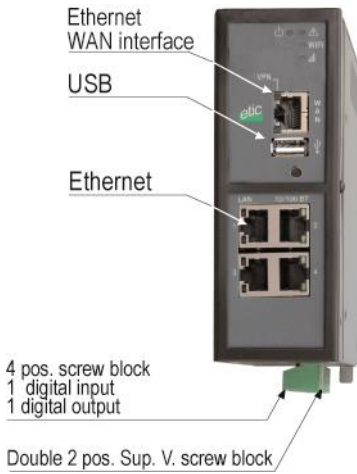**All models except IPL-X-100**
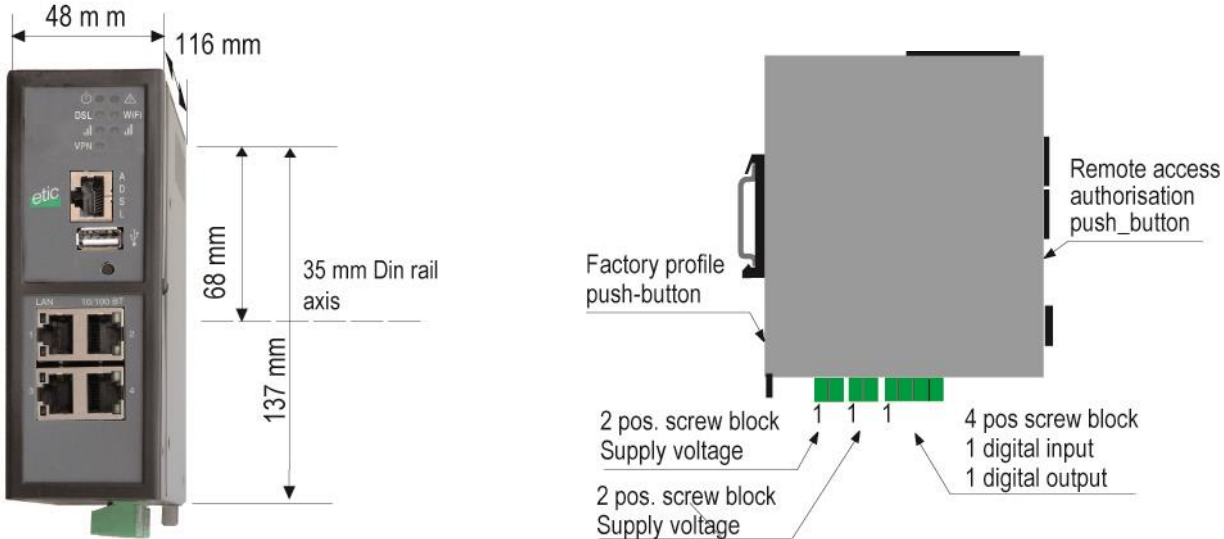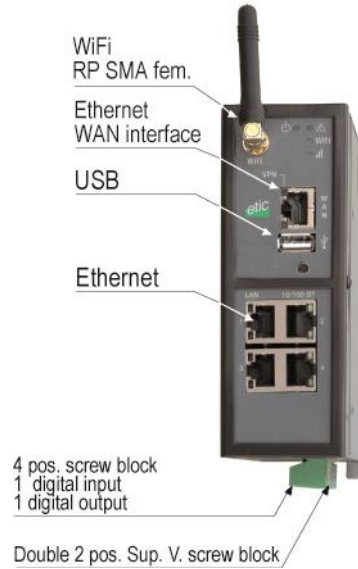

IPL-X-100
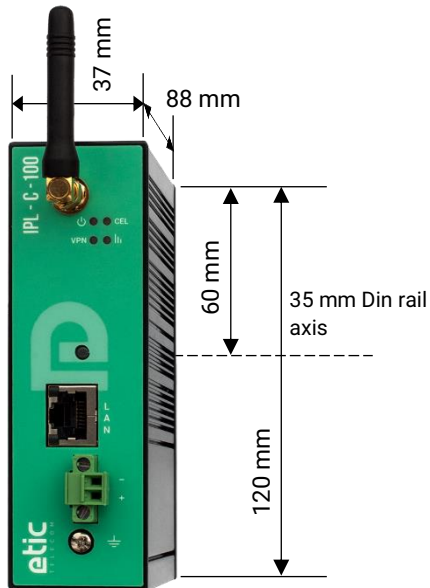
INSTALLATION

1.2 Connectors
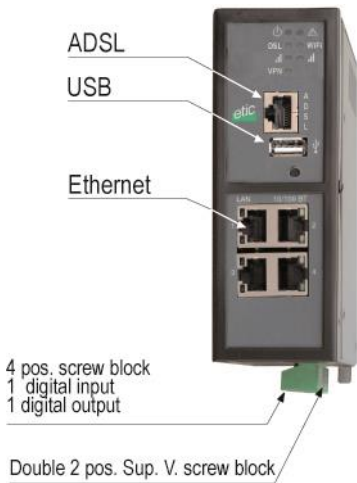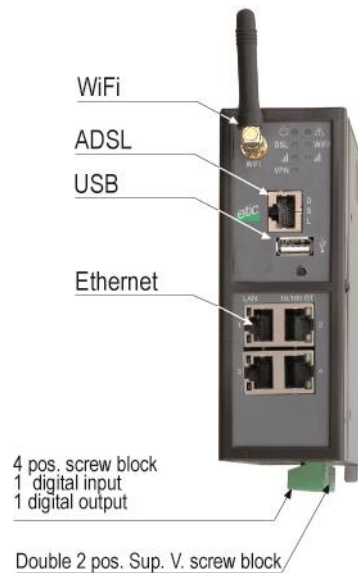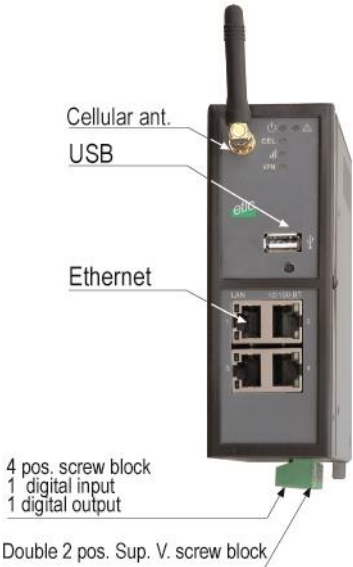
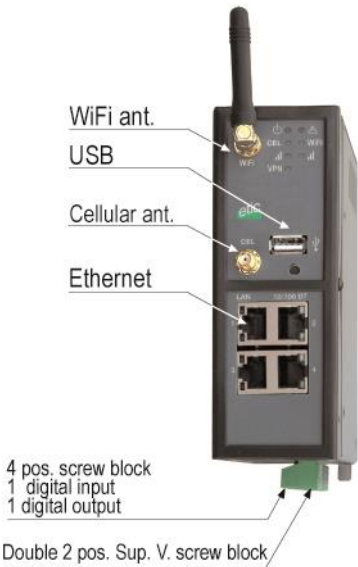**IPL-E-400**   **IPL-EW-400**
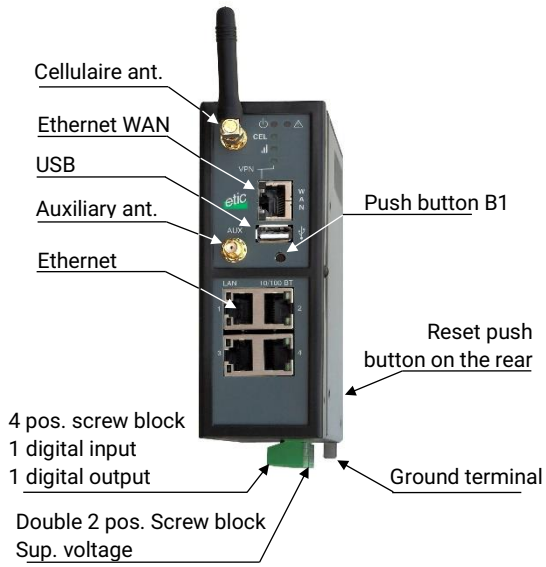

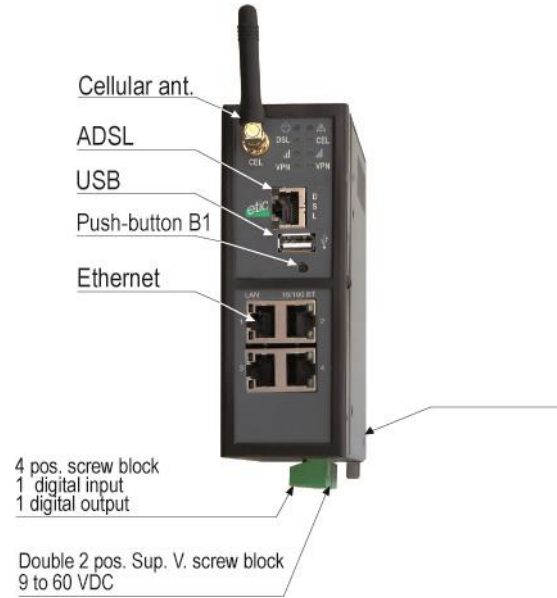**IPL-A-400**   **IPL-AW-400**
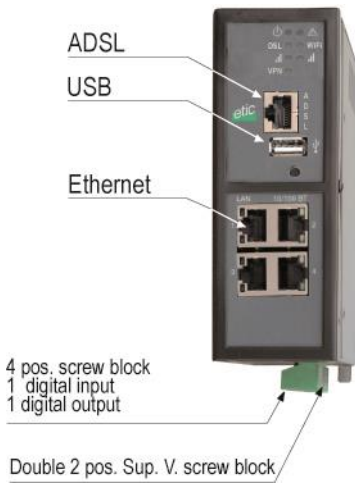
IPL-C-400

IPL-CW-400

INSTALLATION

IPL-DEC-400

Cellulaire ant.

Ethernet WAN

USB

Auxiliary ant.

Ethernet

Push button B1

Reset push button on the rear

4 pos. screw block
1 digital input
1 digital output

Double 2 pos. Screw block
Sup. voltage

Ground terminal

IPL-DAC-400

Cellular ant.

ADSL

USB

Push-button B1

Ethernet

4 pos. screw block
1 digital input
1 digital output

Double 2 pos. Sup. V. screw block
9 to 60 VDC

IPL-DAE-400

ADSL

USB

Ethernet

4 pos. screw block
1 digital input
1 digital output

Double 2 pos. Sup. V. screw block

Serial interfaces

IPL-X-220

Ethernet

RS485 (2 wires)

RS232

IPL-X-230

Ethernet

RS232

RS232

IPL-X-260

Ethernet

RS422 isolated
(4 wires)

DIP switches

IPL-X-261

Ethernet

RS485 isolated
(3 wires)

DIP switches

INSTALLATION

IPL-E-100

Ethernet WAN

Push button B1

Ethernet LAN

2 pos. screw block Power

Reset push button on the rear pannel

Ground

IPL-EW-100

Wi-Fi

Ethernet WAN

Push button B1

Ethernet LAN

2 pos. screw block Power

Reset push button on the rear pannel

Ground

IPL-C-100

Cellular

SIM card on the rear

Push button B1

Ethernet LAN

2 pos. screw block Power

Reset push button on the rear pannel

Ground

All models except IPL-X-100 Ground terminal	
Symbol	**Description**
	FASTON male lug 6.35 mm

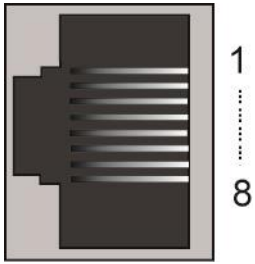| Ground terminal	
Symbol	**Description**
⏚	M4 screw terminal

All models except IPL-X-100 2 positions screw terminal: Supply voltage 1 Position 1 at back – Protected against reverse polarity		
Position	**Signal**	**Function**
1	Power 1 +	12 - 48 VDC
2	Power 1 -	0V

All models except IPL-X-100 2 positions screw terminal: Supply voltage 2 Position 1 at back – Protected against reverse polarity		
Position	**Signal**	**Function**
1	Power 1 +	12 - 48 VDC
2	Power 1 -	0V
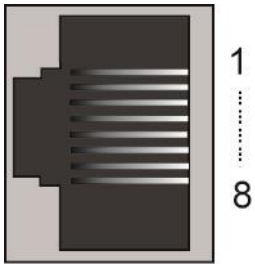
IPL-X-100 2 positions screw terminal: Supply voltage Protected against reverse polarity		
Position	**Signal**	**Function**
1	Power 1 +	12 - 24 VDC
2	Power 1 -	0V

All models except IPL-X-100 4 positions screw terminal: Digital input and output Position 1 at back		
Position	**Signal**	**Function**
1	0V	Digital input 0V
2	In	Digital input
3	F +	Digital output + (max 50Vdc - 0,1A)
4	F -	Digital output -

INSTALLATION

Ethernet RJ45 connector			
Position	**Signal**	**Function**	**RJ45**
1	Tx +	Emission polarity +	
2	Tx -	Emission polarity -	
3	Rx +	Reception polarity +	
4	N.C	-	
5	N.C	-	
6	Rx -	Reception polarity -	
7	N.C.	-	
8	N.C.	-	

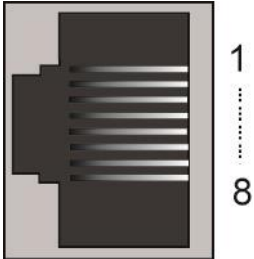| Antenna connectors			
Antenna	**Network**	**Type**	**Observation**
CEL	Cellular	SMA female	3G et 4G
AUX	Cellular	SMA female	To improve the 4G transmission data rate, 2 antennas can be connected (except IPL with Wi-Fi).
Wi-Fi	Wi-Fi	RP-SMA female	Reverse polarity connector compliant with Wi-Fi antennas.

IPL-A, IPL-DAC, IPL-DAE ADSL RJ45 connector			
Position	**Signal**	**Function**	**RJ45**
1	N.C.	-	
2	N.C.	-	
3	N.C.	-	
4	TIP	ADSL line	
5	RING	ADSL line	
6	N.C.	-	
7	N.C.	-	
8	N.C.	-	

IPL-X-220 2 positions screw terminal : RS485		
Position	**Signal**	**Function**
1	A	RS485 polarity A
2	B	RS485 polarity B

IPL-X-261 3 positions screw terminal : RS485 isolated		
Position	**Signal**	**Function**
1	Com	Common isolated
2	B (+)	RS485 polarity B
3	A (-)	RS485 polarity A
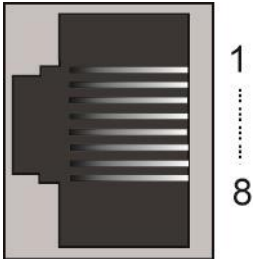
IPL-X-260		
5 positions screw terminal : RS422 isolated		
Position	**Signal**	**Function**
1	Tx+	Emission polarity +
2	Tx-	Emission polarity -
3	Com	Common isolated
4	Rx+	Reception polarity +
5	Rx-	Reception polarity -

IPL-X-220 et IPL-X-230				
RJ45 connector : RS232				
To connect a DCE				
Position	**Signal**	**Direction**	**Function**	**RJ45**
1	DTR - 108	OUT	Data terminal ready	
2	TD - 103	OUT	Data Emission	
3	RD - 104	IN	Data Reception	
4	DSR - 107	IN	Data set ready	
5	SG - 102	-	Ground	
6	Not used	OUT	-	
7	CTS - 106	IN	Clear to send	
8	RTS - 105	OUT	Request to send	

OUT = Signal supplied by the RAS.

IN = Signal supplied by the external device.

IPL-X-220 et IPL-X-230				
RJ45 connector : RS232				
To connect a DTE				
Position	**Signal**	**Direction**	**Function**	**RJ45**
1	CD - 109	OUT	Carrier detect	
2	RD - 104	OUT	Data Reception	
3	TD - 103	IN	Data Emission	
4	DTR - 108	IN	Data terminal ready	
5	SG - 102	-	Ground	
6	DSR - 107	OUT	Data set ready	
7	RTS - 105	IN	Request to send	
8	CTS - 106	OUT	Clear to send	

OUT = Signal supplied by the RAS.

IN = Signal supplied by the external device.

INSTALLATION

1.3   Push-buttons

Rear panel push-button		
Pressing the PB	**LED** ⏻	**Function**
During operation	Flashing red	Temporary return to the factory configuration. (IP address 192.168.0.128) The current configuration is not lost.
During power-up	Flashing red	Return to the factory configuration. The current configuration is deleted except if it has been saved into a file.

Front panel push-button		
Pressing the PB	**LED** ⏻	**Function**
10 seconds	5 flashes	The hotline of ETIC TELECOM is authorized to connect remotely to the router administration server within a 1 hour delay.

1.4   LED indicators

LED indicators Depending on models		
Function	**LED**	**Description**
Operation	⏻	Off — Power off Steady green — The unit is ready Slow blinking green — The unit is busy Steady red — Startup (30s) – Hardware or software failure or SIM card missing or memory flash drive missing Fast blinking red — Firmware download in progress
Application alarm	⚠	See Alert & Display application
ADSL connection	**DSL**	Off — ADSL interface disabled Flashing 4 s — ADSL signal not detected / Line not connected Slow blinking 2 s — Connection in progress 1st step (adsl) Fast blinking 0,5 s — Connection in progress 2nd step (password and @ IP) Steady green — Connected / Brief flashing when traffic on link
ADSL signal quality	▮▮▮	Off — No signal measured 1 flash — Not sufficient signal 2 flashes — Sufficient signal 3 flashes — Strong signal
Cellular connection	**CEL**	Off — SIM card missing - wrong PIN code – Cellular interface disable Flashing every 4 s — Interface enable - not connected Blinking slowly - 2 s — Connection in progress (first step) Blinking fast - 0,5 s — Connection in progress (password and IP@) Steady green — Connected / Brief flashing when traffic on link
Cellular signal quality	▮▮▮	Off — No signal measured 1 flash — Not sufficient signal 2 flashes — Sufficient signal 3 flashes — Strong signal
VPN connexion	**VPN**	Off — No VPN connection in progress Blinking slowly - 2 s — Connection in progress Steady green — At least one VPN is established
Ethernet WAN	**Lower LED**	Off — Not connected or interface disable Green — Connected / Brief flashing when traffic on link
Wi-Fi connection	**Wi-Fi**	Off — Interface disable or enable as an access point Flashing every 4 s — Interface enable - not connected Blinking fast - 0,5 s — Connection in progress Steady green — Connected / Brief flashing when traffic on link
Wi-Fi signal quality	▮▮▮	Off — Wi-Fi not enabled or enabled as an access point 1 flash — Faint not sufficient signal 2 flashes — Sufficient signal 3 flashes — Strong signal
Ethernet LAN 1 to 4	**Lower LED**	Off — Not connected or interface disable Green — Connected / Brief flashing when traffic on link
IPL-X-220, IPL-X-230, IPL-X-260, IPL-X-261		
RS232/RS485	**Rx**	Characters received from the RS232 or RS485/RS422 serial interface
	Tx	Characters transmitted to the RS232 or RS485/RS422 serial interface

INSTALLATION

2   Safety instructions

The product shall be installed in a fire electrical resistant cabinet by a qualified operator.

The product shall be connected only to equipment that complies with the IEC60950-1 or IEC62368-1 standards and that meets the following classifications:

- IEC60950-1 : Limited power circuits and SELV type – §2.2 and 2.5
- IEC62368-1 : ES1 & PS2

⚠ The IPL-X-100 contain a non-replaceable lithium-metal battery. To avoid any risk of explosion or leakage of flammable liquid or gas, make sure to:

- not exceed the max temperatures specified during use, storage or transportation.
- not subject the product to a low pressure below 116mBar (15 000 m).
- not put this product into a fire or hot oven or cause mechanical cuts or crushing when disposing.

⚠ To avoid any risk of burns, it is strongly recommended to wear gloves to handle the product in operation when the ambient temperature exceeds 30 °C.
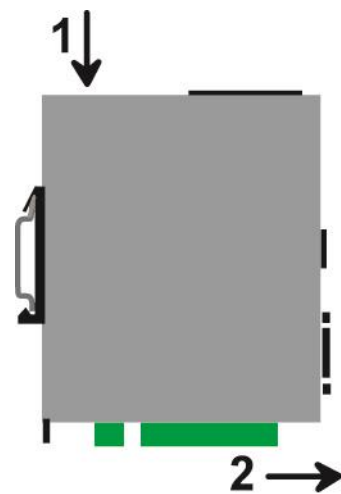
Cellular or Wi-Fi models:

- The antenna should be installed and operated with minimum distance of 20 cm between the radiator and your body.
- The antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

3   DIN rail mounting

Mounting the unit on the 35 mm horizontal DIN rail
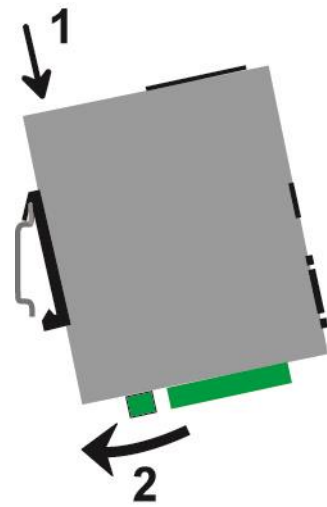
Removing the unit from the DIN rail

4   Cooling

The product is designed to be mounted on a 35mm DIN rail.
To avoid obstructing the airflow around the unit, the spacing must be at least 25 mm above and below, and 10 mm left and right.

INSTALLATION

5   Power supply

All models except IPL-X-100 :
These products provide a dual power inputs allowing a redundancy power supply.
The supply voltage must be regulated and strictly between 10 and 60 Volt DC (nominal: 12 – 48 VDC).
At power up the inrush current can reach 20 A for 100 µs.

IPL-X-100 :
These products provide a single power input.
The supply voltage must be regulated and strictly between 10 and 30 Volt DC (nominal: 12 – 24 VDC).
At power up the inrush current can reach 20 A for 100 µs.

6   Earthing

IPL-A, IPL-DAC et IPL-DAE :
For safety and EMC reasons, the ground terminal must be connected to the protective earth of the installation.

Other IPL :
For EMC reasons, the ground terminal must be connected to the functional (or protective) earth of the installation.

7   RS232 serial connexion (IPL-X-220, IPL-X-230)

Cables can be provided to connect the product to DTE and DCE as follows:

| RS232 cables		
Reference	**Connector**	**Function**
CAB592	SubD 9 male	To connect a DCE to the product
CAB593	SubD 9 female	To connect a DTE to the product
CAB609	Wires	To connect a device providing a specific connector

The RS232 cable must be shorter than 10 meters.

8   RS485 serial connexion (IPL-X-220)

The RS485 interface is not isolated.

Two 10 KOhm bus polarization resistors are included inside the product.

If the RS485 line is longer than 10 meters or if the data rate is greater than 19200 b/s, it is necessary to connect one 120 Ohm matching resistor at each end of the line and two 390 Ohm polarization resistors at one of the two extremities of the line.
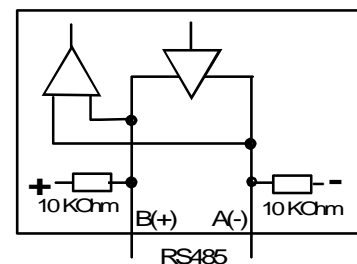
9 RS422 isolated serial connection (IPL-X-260)

The polarization and termination resistors can be selected with DIP switches.

The termination resistor must be enabled when the product is located at the extremity of the RS422 bus.
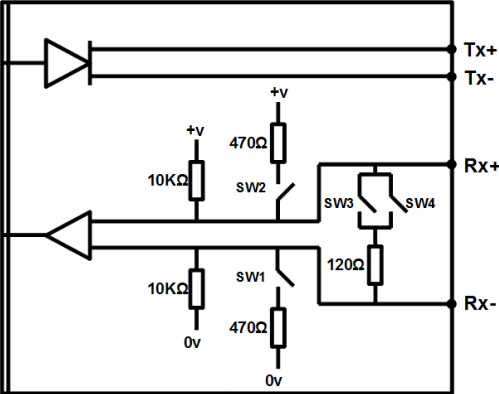
The polarization resistors must be enabled by one device of the bus.

Up to 16 devices can be connected to the bus.

We recommend to use a shielded cable and twisted pairs.

When two devices or more are connected to the RS422 bus, the XSLAN+ must be the only device to transmit data on the TX+/TX- line towards all the other devices.

It means that the TX+/TX- line of the IXSLAN+ must be connected to the RX+/RX- of all the other devices of the bus.

Micro-switches	
1 2 3 4 ON OFF	No polarization No termination resistor
1 2 3 4 ON OFF	470 Ohm polarization resistors No termination resistor
1 2 3 4 ON OFF	No polarization 120 Ohm termination resistor
1 2 3 4 ON OFF	470 Ohms polarization resistors 120 Ohm termination resistor
	All other combinations are prohibited

INSTALLATION

## 10   RS485 isolated serial connection (IPL-X-261)

The polarization and termination resistors can be selected with DIP switches.

The termination resistor must be enabled when the product is located at the extremity of the RS485 bus.

The polarization resistors must be enabled by one device of the bus.

Up to 16 devices can be connected to the bus.

We recommend to use a shielded cable and twisted pairs.
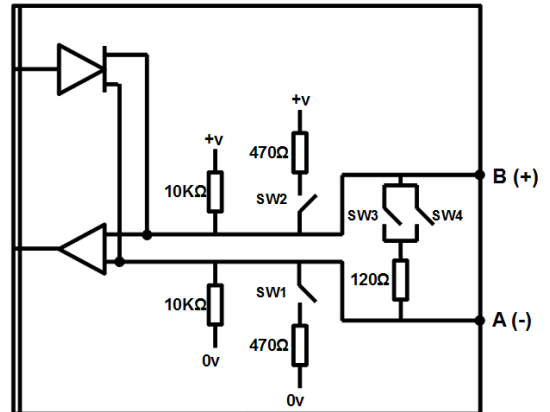
Micro-switches	
	No polarization No termination resistor
	470 Ohm polarization resistors No termination resistor
	No polarization 120 Ohm termination resistor
	470 Ohms polarization resistors 120 Ohm termination resistor
	All other combinations are prohibited

11   Digital input and output
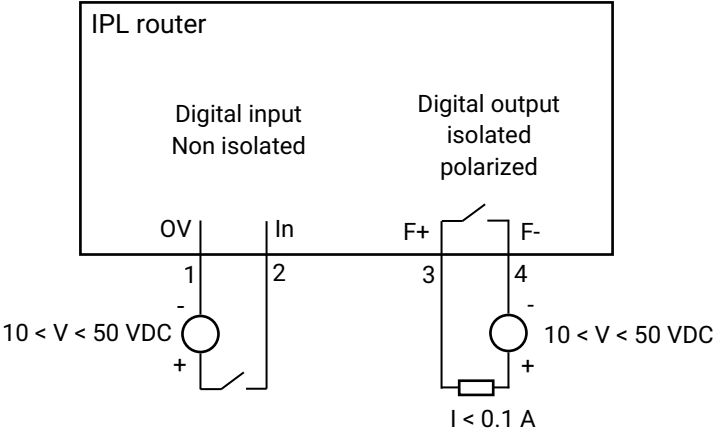
To check that the input and the output are correctly wired :

In the menu, select
Diagnostics > Hardware > Input/Output

The status of the input is displayed and the output can be switched ON or OFF.

12   Connecting to the ADSL line

Line length / signal level :
The IPL-A can be connected to an analogue line telephone line or an unbundled loop when the attenuation of the reception signal is better than   63 dB

When the reception level is close to the limit, disconnections may occur.

In that situation, we recommend to ask to the ISP to setup the line with the RE-ADSL modulation which is suited for long line and weak signal.

ADSL filter :
If the line must be used for analogue voice transmission simultaneously with ADSL transmission, it is necessary to connect an ADSL filter.

Surge arrester :
The ADSL board of the IPL-A is protected very carefully against over voltage coming from the line.
However, when the line is exposed to lightning, we recommend to connect a surge arrester between the line and the IPL.
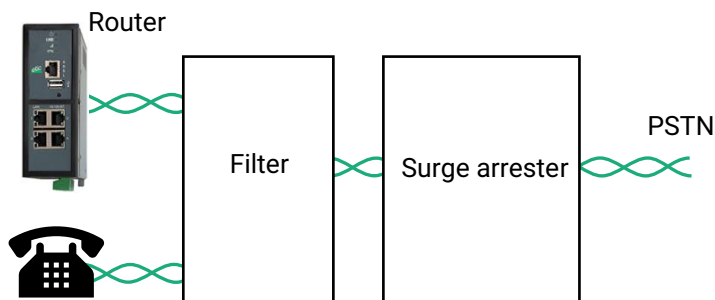
IP address :
The IP address assigned by the ISP to the ADSL interface of the IPL can be a fixed or a dynamic public IP address.

If it is dynamic, it changes frequently; for instance at each ADSL connection.

It is why, the router which owns a dynamic IP address can only initiate the communication (initiate a VPN for instance) towards a router owning a fixed IP address.

Reciprocally, a router owning a dynamic IP address cannot easily receive a connection except a Dynamic DNS service is used.

13   Connecting to the cellular network

13.1   Pre-installation checks

Authorization to use a cellular connection
Check the cellular connection is authorized at the location where the IPL is supposed to be installed.

Control of the reception level before installing the machine
Before installing the IPL, refer to a cell map over the Internet to check that the cellular reception signal is strong enough at the location where the machine is supposed to be installed.

Select the right mobile service provider.

Reception level confirmation
If the reception seems possible, confirm with a control on site.
The reception level can be measured with a smartphone.
Most smartphones provide the reception level information (parameters or diagnostic menu).

To carry-out that control, use mandatorily a SIM card subscribed with the mobile service provider selected for the IPL.

Remark:
The IPL itself provides the reception level information in two ways:
    A reception level led indicator
    The diagnostic menu of the administration web server

13.2   Cellular antenna

The antenna shall not be installed inside metal cases.

The antenna is supplied separately. Use only an approved antenna.

We provide a complete catalog of cellular antennas.

13.3   Coaxial cable

If necessary, the antenna can be connected to the IPL through a coaxial cable.

The signal attenuation in a usual coaxial cable is 0.2 to 0.4 dB / m, that is to say 2 to 4 dB for a 10 meters long cable.

If a coaxial cable must be used to connect the antenna to the IPL, the attenuation in the cable has to be taken into account to calculate the effective RF signal received by the IPL.

Refer to our cables and antennas catalogue.

13.4   Cellular service subscription

The IPL is designed to connect to the LTE-UMTS-GPRS data transmission service like the one used by the tablets.
The subscription should also provide the SMS service if SMS alarms are required.
A telephone service subscription is not needed.

One will take care to subscribe to a service authorizing the right volume of data per month (MB/month) and to check the price of the MB exceeding the limit of the subscription plan, if it exists.

The subscription must be preferably signed in the country where the machine is supposed to be installed to avoid roaming costs.

13.5 Installing or removing the SIM card

All cellular IPL models except IPL-C-100,

These models provide two SIM card holders. If you use only one SIM card, use the SIM card holder Nr 1 (at left on the pictures).

Installing the SIM card:

- Power off the IPL.
- Remove the anti-steal lid at the top of the product
- Insert the SIM card according to the drawing.
- Push the card until it locks.

Removing the SIM card:

- Power off the IPL.
- Remove the anti-steal lid at the top of the product.
- Push on the SIM card to unlock it.
- Remove the SIM card.

IPL-C-100

Installing the SIM card:
- Power off the IPL.
- With a small tool, push on the button to release the SIM card holder on the back.
- Insert the SIM card into the card holder as shown in the picture.
- Position the card holder in the slides le.
- Push the card until it locks.

Removing the SIM card:
- Power off the IPL
- With a small tool, push on the button to release the SIM card holder on the back.
- Remove the SIM card from the card holder and put it back in place.
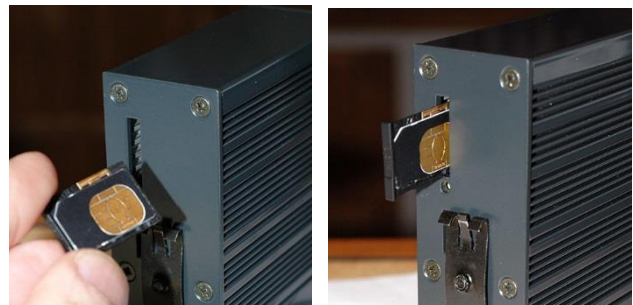
INSTALLATION

13.6   Controlling the conformance of the connection

After installing and setting up the IPL, control the conformance of the connection:

Reception level
The reception level must be better than -90 dBm (two flashes of the reception level led indicator).
See the table below.

PING error rate
Each PING request must receive an answer.

Network response delay to a PING request
The response delay must be better than 500 ms.
If the delay is longer than one second, it means the network is overloaded or that the signal level is weak.

If the connection is not conform, change the position of the antenna or select an alternative service like UMTS instead of LTE for instance.

Cellular network reception level LED		
State	**Description**	**Reception level dBm**
3 flashs	<u>Strong signal</u>	-50 à - 80
2 flashs	<u>Sufficient signal</u> The connection is reliable but the data rate may be reduced due to transmission errors.	-81 à −90
1 flash	<u>No sufficient signal</u> Connection drops and errors may append. Try to improve the reception level.	-91 à -110
Off	<u>No signal</u> Check the antenna connector and the presence of the SIM card.	< -111

To control the signal level with the html server:

- In the menu, select **Diagnostics > Network status > Interfaces**.

PREPARING THE SETUP

1	Connecting a PC for configuration

1.1   Overview

The IPL is configured using a PC with a web browser. No additional software is required.

Online help:
For most pages of the administration server an help page is available by clicking **?** located at the top right of the page.

Administration server address:
When the product is delivered, the IP address of the administration web server is 192.168.0.128.

First setup:
For the first configuration, we advise to connect the PC directly to the LAN interface of the IPL.
Subsequent changes can be made remotely.

Restoring the factory IP address:
The factory IP address 192.168.0.128 can be restored (see the User guide of the product).

Restricted access to the administration server:
If you do not have access to the administration server, it is probably that access has been restricted for security reasons or for other reasons.

Network IP address:
Later in the text, we often speak of "network IP address". We mean the lowest value of the addresses of the network.
For instance, if the netmask of a network is 255.255.255.0, the network IP address of that network is terminated by a zero (X.Y.Z.0.).

Characters allowed:
Accented characters are not supported.

PREPARING THE SETUP

1.2   First configuration

Step 1: Create or modify the PC TCP/IP connection
Assign to the PC an IP address different but consistent with the factory IP address of the IPL.
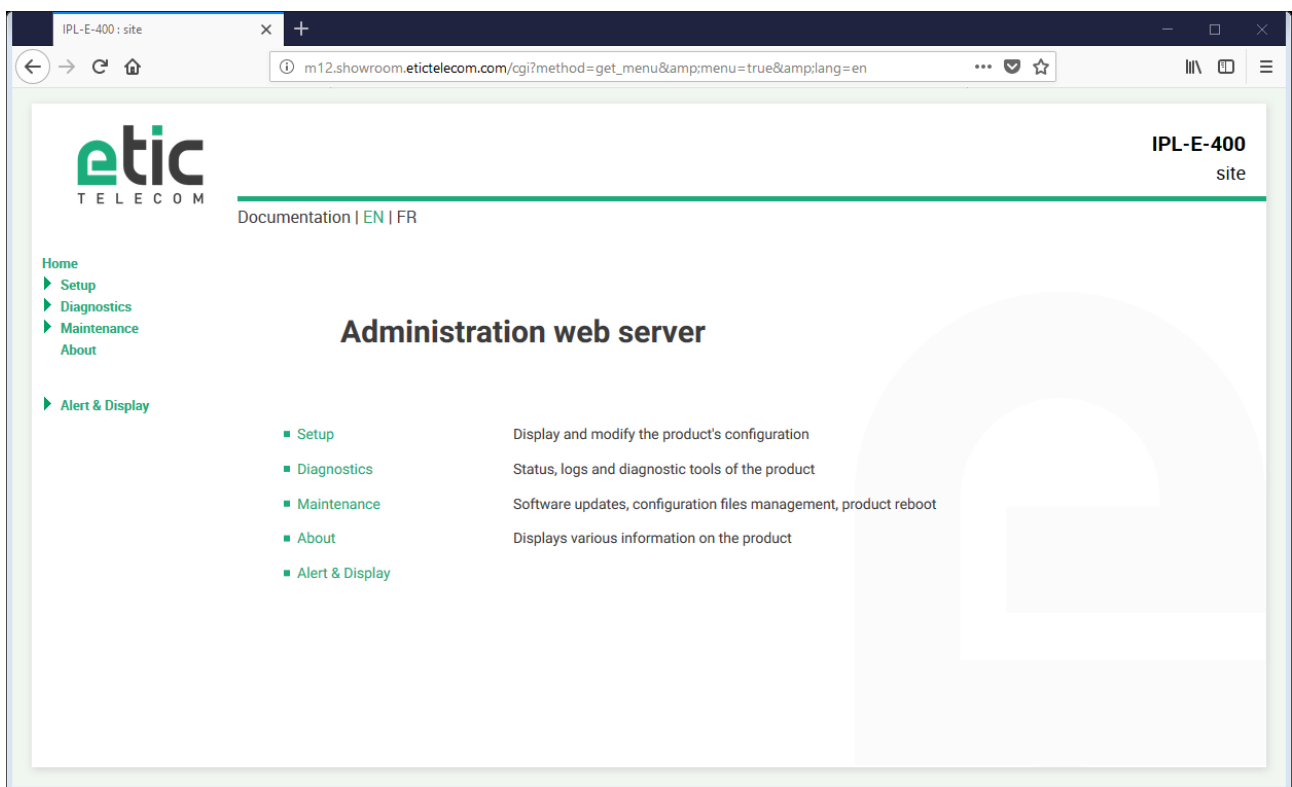For the first configuration, assign for instance 192.168.0.1 to the PC.

Step 2: Connect the PC to the IPL
Connect the PC directly to the IPL with any Ethernet cable (straight or cross-wired);

Step 3: Launch the web browser
Launch the web browser and then enter the IP address of the IPL: 192.168.0.128

The Home page of the administration server is displayed.

Note: Access to the administration server is not protected when configuring the IPL for the first time.

1.3   Changing the configuration later

Thereafter, the IPL administration server is accessible from the local Ethernet interface or remotely through a remote connection at the IP address assigned to the product.

By default, the access to the administration web server is not allowed through the WAN interface.

2	Access to the administration server through the WAN interface

To allow the access to the administration server through the WAN interface:

- In the menu, choose **Setup > Security > Administration rights**.

- Enter the username and the password.

- Select the protocol to use for configuration **HTTPS only** or **HTTP and HTTPS**.

- Tick the **Enable access from the WAN(s)** checkbox.

The administration server is accessible with HTTPS through the WAN or the LAN interface.

3	Working with HTTPS

Once HTTPS has been selected, proceed as follows:

The port 4433 is assigned to administration server.

- Open the web browser and enter the IP address of the IPL administration server:
  Example: https://192.168.38.191:4433.

- Click **Next** when a warning message is displayed

- Enter the user name and password that have been set to protect access to the administration server.
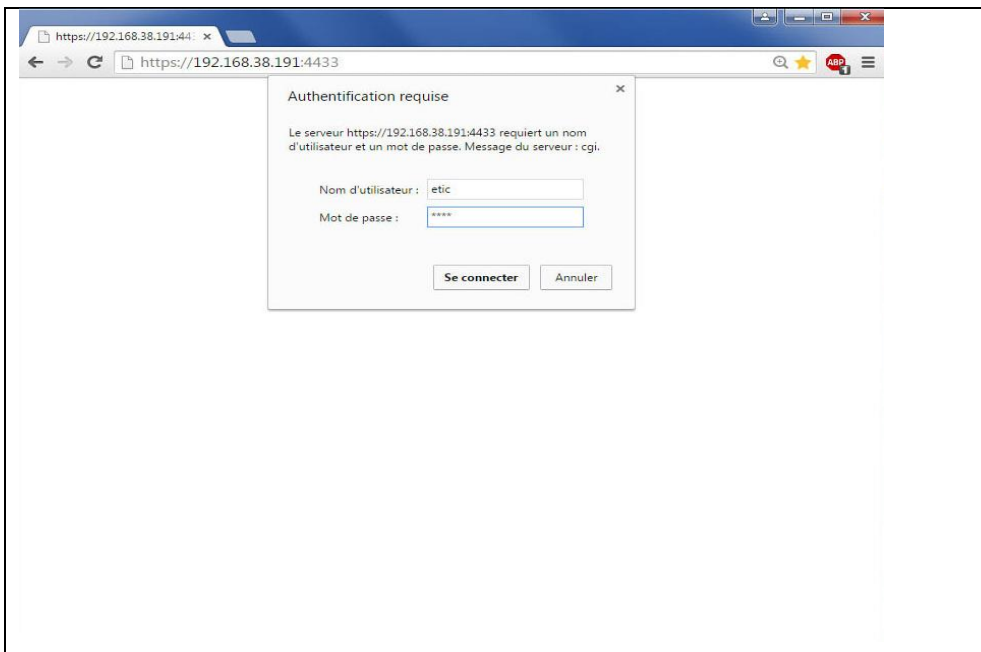
The home page of the administration server is displayed.

4   Temporary return to the factory settings

If the IP address of the IPL could not be founded, or if it is impossible to access the administration server, for example, following a configuration error, it is possible to restore the factory settings without losing the current configuration.

- Press the push-button located on the back, for example with a small screwdriver

- Keep the push-button pressed for about 3 seconds;

- The LED ⏻ blinks red rapidly

- The administration server becomes accessible at the factory IP address (192.168.0.128), in HTTP without a password. The factory configuration is temporarily running. However, the current configuration is not lost and it is the one that is still displayed in the pages of the Administration Server.

- After reading the IP address or changing some parameters, press again the push button or reboot the product.

- The product can be reached at the registered IP address.

Note:
If the IP address of the IPL is unknown, the software tool EticFinder can be used.
This software detects all ETIC branded products on a local network. After starting the software, click on the "Search" button, and when the product list is displayed, double-click on the product address to access the html server.

5   Restoring the factory settings

It is possible to restore the factory configuration permanently using the push button on the rear panel, or by using the administration server. In this case, the current configuration will be lost unless it has been saved to a file.

To restore the factory settings using the push button,

- Power off the IPL,

- Press the push-button located on the back, for example with a small screwdriver,

- Power on the IPL, while keeping the push-button pressed at least 10 s.

The LED ⏻ turns red; the IPL boots and the factory configuration is restored.

Note: The factory configuration can also be restored via the menu **Maintenance > Configurations management** of the administration server.

6   Protecting the access to the administration server

- In the menu, choose **Setup > Security > Administration rights**
- Enter a user name and password to protect the administration server.
- Tick the **Password protect the web site access** checkbox

If the username and password to access the administration server are lost, you have to temporarily return to the factory settings; access to the administration server is then free.

7   Configuration steps

To configure the product, we advise to proceed as follows:

- Set up the LAN interface
- Set up the WAN interface
- Set up the routing functions
- Set up VPNs
- Set up the remote access
- Set up the firewall
- Set up the serial gateways

For details about the advanced setup, refer to the Routing Setup Guide:
Reference: "DOC_DEV_Router setup guide_x"

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