## 1) Scope

This guide describes the installation of the iConn retrofit kit in a Gardner Denver Compressor



## 2) Supported Controllers by iConn

Only controllers in the following table are supported by the standard retrofit Kit. Models not included might require an specific software.

| Compressors Controller | Min soft. Ver. for V2.04 | Min Version for V2.05 | Min Version for V2.10 |
|---|---|---|---|
| DELCOS Pro-L | DPro-L-1.18 | DPro-L-1.18 | DPro-L-1.18 |
| DELCOS Pro-LSR | DPro-LSR-1.05 | DPro-LSR-1.05 | DPro-LSR-1.05 |
| DELCOS Pro-LRS | DPro-LRS-1.02 | DPro-LRS-1.02 | DPro-LRS-1.02 |
| DELCOS 3100-L | SD31V2.05 | SD31V2.05 | SD31V2.05 |
| DELCOS 3100-LSR | SD31S1.16 | SD31S1.16 | SD31S1.16 |
| DELCOS 3100-LRS | SD31R2.03 | SD31R2.03 | SD31R2.03 |
| DELCOS 3100-LRS (V2) | D31RS1.06 | D31RS1.06 | D31RS1.06 |
| DELCOS 3100-DH | HD31V2.05 | HD31V2.05 | HD31V2.05 |
| DELCOS 3100-DHSR | HD31S1.22 | HD31S1.22 | HD31S1.22 |
| DELCOS 3100-DHRS | HD31R1.34 | HD31R1.34 | HD31R1.34 |
| DELCOS 3100-R | RD31V1.04 | RD31V1.04 | RD31V1.04 |
| DELCOS XL-L | DXL-L-1.02 | DXL-L-1.02 | DXL-L-1.02 |
| DELCOS XL-LRS | DXL-LRS-1.04 | DXL-LRS-1.04 | DXL-LRS-1.04 |
| DELCOS XL-DH | DXL-DH-1.00 | DXL-DH-1.00 | DXL-DH-1.00 |
| DELCOS XL-DHRS | DXL-DHRS-1.00 | DXL-DHRS-1.00 | DXL-DHRS-1.00 |
| DELCOS XL-D | – | DXL-D-1.00 | DXL-D-1.02 |
| DELCOS XL-DRS | – | DXL-DRS-1.00 | DXL-DRS-1.02 |
| Hydrovane Pro | HPro-V1.01 | HPro-V1.01 | HPro-V1.01 |
| Hydrovane Pro RS | HPro-RS-V1.03 | HPro-RS-V1.03 | HPro-RS-V1.03 |
| GD Pilot (ESM) | DPro-L-1.18 | DPro-L-1.18 | DPro-L-1.18 |
| GD Pilot (VS) | DPro-LRS-1.02 | DPro-LRS-1.02 | DPro-LRS-1.02 |
| GD Pilot MK (ESM) | SD31V2.05 | SD31V2.05 | SD31V2.05 |
| GD Pilot MK (VS) | D31RS1.06 | D31RS1.06 | D31RS1.06 |
| GD Pilot TS (ESM) | DXL-L-1.02 | DXL-L-1.02 | DXL-L-1.02 |
| GD Pilot TS (VS) | DXL-LRS-1.04 | DXL-LRS-1.04 | DXL-LRS-1.04 |
| GD Pilot TS (Enviro) | DXL-DH-1.00 | DXL-DH-1.00 | DXL-DH-1.00 |
| GD Pilot TS (Enviro VS) | DXL-DHRS-1.00 | DXL-DHRS-1.00 | DXL-DHRS-1.00 |
| GD Pilot TS (Enviro T) | – | DXL-D-1.00 | DXL-D-1.02 |
| GD Pilot TS (Enviro TVS) | – | DXL-DRS-1.00 | DXL-DRS-1.02 |
| AirSmart (ES) | asc-0221-0205-0206 | | |
| AirSmart (VS) | asc-0221-0205-0206 | | |
| Delcos 1000 | Only compatible software versions with SAM | | |
| Smart Air Master | | | |

### 3) Incompatibility

- ☢ The retrofit iconn Kit is not compatible with any other controller apart from the ones shown in the above list.
- ☢ Installations with BLS (Base Load System) installed, might require additional hardware
- ☢ Installations with a PLC/SCADA system already connected to the same MODBUS might require additional software configuration to make them compatible with iConn and allow coexistence of both.

### 4) Previous installation

a. Ensure that the iConn customer datasheet containing the relevant information to configure the customer account and technical information has been sent to the GD central support specifying equipment, type of service and destination for alarms.

b. Check that you have received the iConn retrofit installation kit containing the following items
- iConn Gateway
- 15W-24W DIN rail mounting power supply
- iConn 3G/4G antenna,
- Power and communications cable
- Ancillary: cable ties, cable tie holders and RS485 connector

c. Confirm that every compressor to be monitored by the gateway is properly connected to the iConn Gateway via a MODBUS network. If not proceed as described in point 5.1.
Note: in very electromagnetic noisy environments, shielded cable might be required.

d. Find the best place to locate gateway and power supply in the electrical cabinet and the body mounting antenna externally.

### 5) Installation

**DANGER!!**
To install the gateway, it is necessary to access the control cabinet. This should only be carried out by electro-technical specialists after safe electrical isolation of the unit.

**DANGER!!**
Installing the body mounting antenna, might require drill the roof of the electrical cabinet. This must be done with a complete electrical isolation of the electrical cabinet. Every measure to avoid any metallic sewing or dust fall inside the electrical cabinet has to be taken.

**DANGER!!**
Installing the body mounting antenna, might require a leader or any kind of elevation to access the upper part of the compressor. Work safely and ensure someone is supervising the operation.  When drilling, always wear safety glasses and gloves

**WORK SAFE!!**
Electrical isolators should always be locked and warning signs attached.

### 5.1. Modbus wiring

The iConn retrofit Kit can handle up to 12 compressors in the same MODBUS network. It is important to follow the following steps before connecting the gateway

a. Ensure all the compressors/equipment to be monitored by iConn are linked by a suitable MODBUS communication cable (2-3 wires). If electromagnetic noise is high, then a shielded cable might be used.
b. It is mandatory that all the Positive (+) poles of the MOBUS are connected among them and to the A pole of the iConn Gateway (PIN 7). Similarly all the Negative (-) poles of the MOBUS are connected among them and to the B pole of the iConn Gateway (PIN 19)

Note: Be aware that Delcos XL and GD Pilot TS label positive pole as B and negative as A. To avoid this confusion ensure positive poles are connected together and negative poles similarly we will always talk about Positive (+) and Negative (-) and Ground.

| Equipment | Positive (+) | Negative (-) | Ground |
|---|---|---|---|
| iConn Gatway | A | B | C |
| SAM | A | B | C |
| Delcos 3100 | A | B | C |
| Delcos Pro | A | B | C |
| Hydrovane Pro | A | B | C |
| GD Pilot | A | B | C |
| Delcos XL | B | A | C |
| GD Pilot TS | B | A | C |
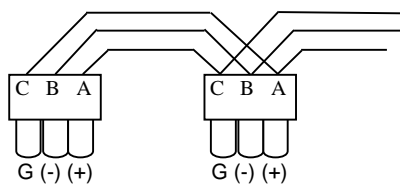


Any Delcos except
Delcos XL& GD Pilot TS
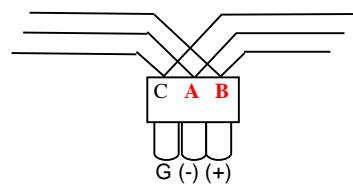
Delcos XL& GD Pilot TS

G
(-) cable  19 RS485 B
(+) cable  7 RS485 A

For a more stable communication, please switch-on the termination resistors for that purpose at the controller situated in the farthest end from the iConn gateway.

### 5.2. Configuring the Controllers

Controllers must have the appropriate transmission speed and no unique node numbers to allow proper communication and messaging.

a. Set the node number in every controller with correlative numbers from 1 to 12 beginning on 1 if possible.
e. Set the same transmission speed in every controller and across the different equipment connected to the bus*. It can be either 19200 baud or 9600 baud. Note that if speed is different from one controller to the other, some controllers won't be read.

\* Refer to specifics manuals of the controllers to do so. The following is an

*Example of how to do it in the Delcos XL*

a.   *In the MAIN SCREEN*            → *Click on SETTINGS MENU*
b.  *communications address **rs485:1***   → *Set it to node number 1 (2, 3 if more)*
c.  *Baud rate*                      → *Set it to 19.200 (eventually 9.600)*

### 5.3. Connecting the emergency Battery in the Gateway (only if supplied)
The unit you are installing has a backup battery to allow raising alarms when losing AC power. For that reason it is convenient to power the gateway as recommended in 5.3.

⚒ **A Torx T10  will be required**

- Open the battery holder
- Insert the battery an plug the connector smoothly
- Close the battery holder to avoid eventual disconnection



Remove with T10 key



Insert and connect batteries

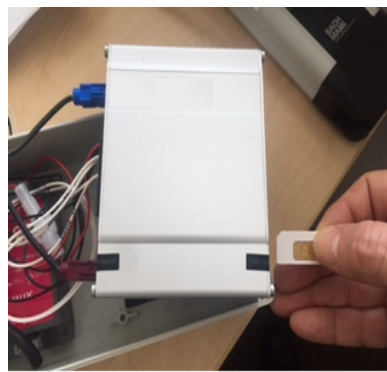### 5.4. Inserting the SIM card in the Gateway

To get access to the SIM card It will be needed to open the battery holder at the rear of the OWA3X. It will be found closed to the battery compartment.

### ✄ A Torx T10 will be required

- Open the battery holder
- Insert the SIM card in the groove paying attention on the cutted corner. Press the card until it gets trapped. The card should remain steadily inside the groove. If the card is not totally located inside, it is not properly inserted, rotate it and try again.
- Cose the battery holder to avoid eventual disconnection.
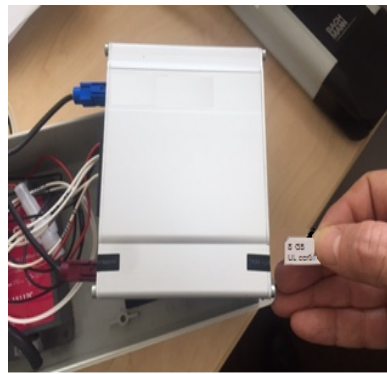


| Remove with T10 key | Insert SIM Card |

### 5.5. Connecting the µSD Card in the Gateway (Only if supplied)
- Open the battery holder using a T10 Tork key
- Insert the µSD card in the appropriate slot
- Close the battery holder to avoid eventual disconnection
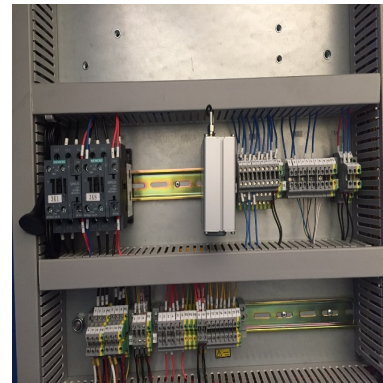


| Remove with T10 key | Insert µSD Card |

### 5.6. Placing the Gateway
- The iConn gateway is supplied with a prefitted DIN rail fixing unit to be installed in the electrical cabinet.
- If there is no free space in the DIN rail always try as first option to install a DIN rail in the electrical cabinet.
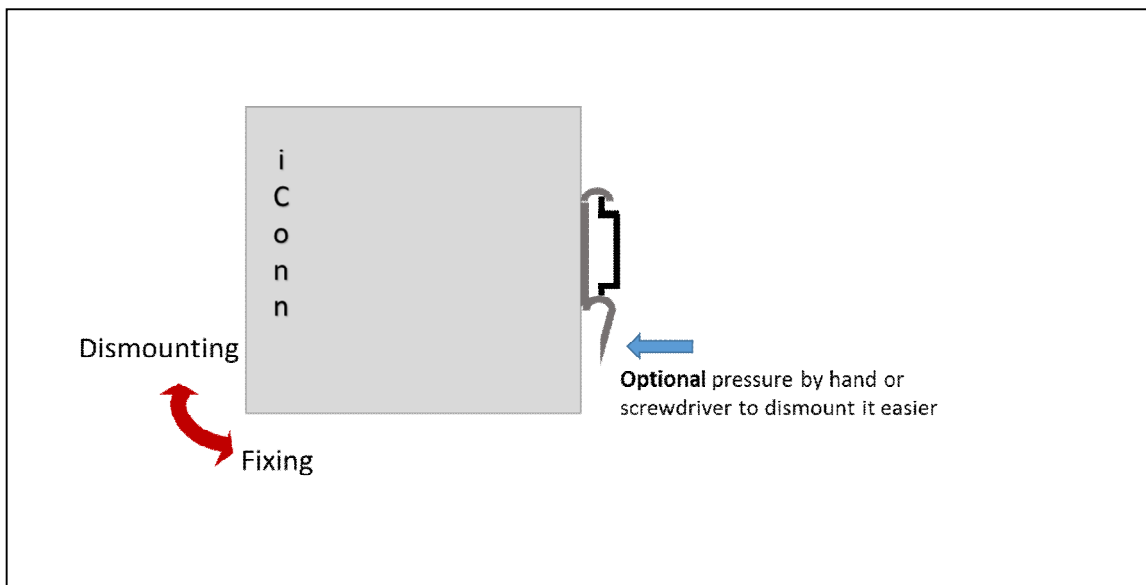
Fixing unit included



Installation in DIN rail

Mounting and dismounting the iConn Gateway



i C o n n

Dismounting

Fixing

**Optional** pressure by hand or screwdriver to dismount it easier

- In the eventuality there is no room available in the electrical cabinet, it might be also installed outside the compressor using an appropriated electrical box (not provided) always ensuring dust, humidity do not affect the normal operation of the gateway. There is a horizontal fixing unit available for that purpose if required



Additional material for mounting
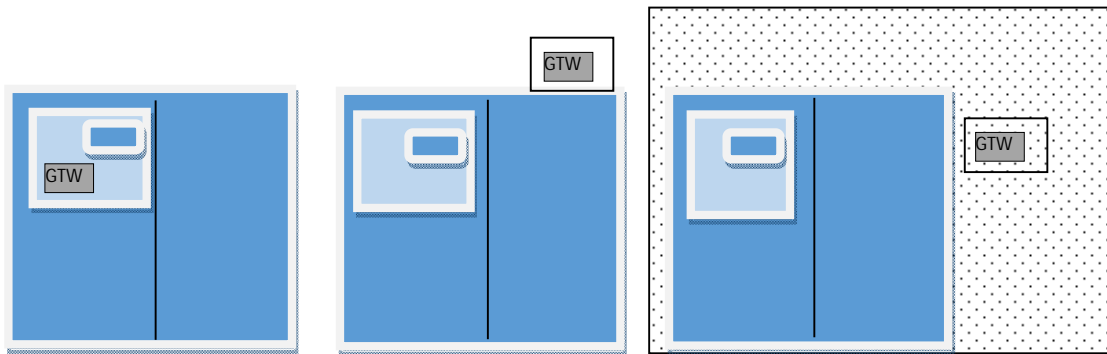
In those cases where there is no room in the cabinet to install it inside, a longer cable could be used to install it externally. In that case a Modbus cable to the controller must be wired.
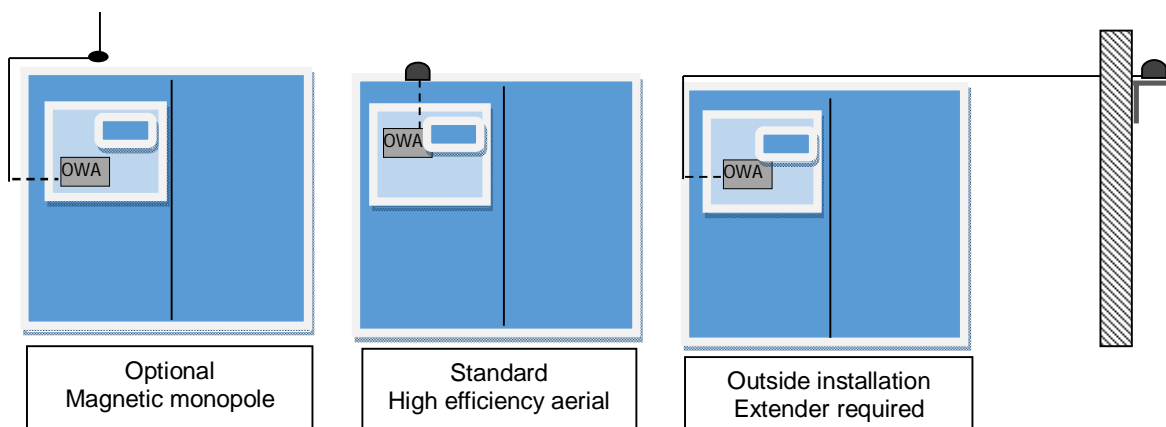
### 5.7. Installing the Antenna

Prior to the installation of the antenna, If there is no certainness that the GSM signal level will be enough to enable an stable GSM communication, it might be desirable to use the

Standard antenna is supplied in the iConn kit with a 3m cable length. Depending on GSM signal, antenna can be located on the machine or, using an antenna extender, on the top of the electrical cabinet or outside the building.
iConn has a GSM signal strength meter integrated that might be helpful to decide the adequate place for the antenna.
Installing the standard high efficiency antenna requires to drill a 19mm diameter hole on the roof of the compressor.
*If not sure about GSM coverage in the room (data signal level on  a smartphone might give us a non-accurate indication) you might want to install the gateway and use the embedded signal level meter prior to definitely install the antenna. If that would be the case you must ensure the gateway is not damaged during the drilling process.*



| Optional Magnetic monopole | Standard High efficiency aerial | Outside installation Extender required |

For geographical areas with insufficient GSM signal level iConn can be connected to the cloud through its Ethernet port. Please refer to paragraph **5.9**

### Drilling the electrical cabinet

**DANGER!!**
Installing the body mounting antenna, might require drill the roof of the electrical cabinet. This must be done with a complete electrical isolation of the electrical cabinet. Every measure to avoid any metallic sewing or dust fall inside the electrical cabinet has to be taken.

**DANGER!!**
Installing the body mounting antenna, might require a leader or any kind of elevation to access the upper part of the compressor. Work safely and ensure someone is supervising the operation. When drilling, always wear safety glasses and gloves

- ✂ **A driller**
- ✂ **A 19mm stepped driller  will be required**
- ✂ **Box or envelope**
- ✂ **Tape**

Prior to drill ensure metallic dust will be collected in a box or envelope to avoid fall on electrical components.
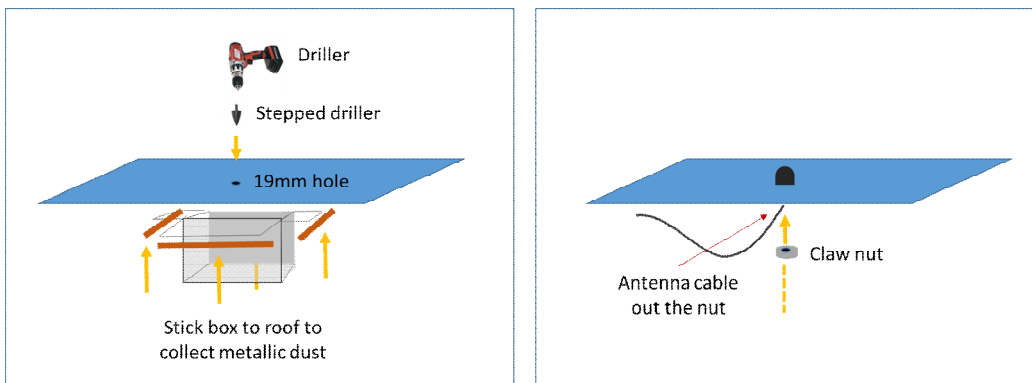
a) Use the drill with the 19mm metal stepped driller to make a clean 19mm hole on the roof of the electrical cabinet.
b) Once the 19mm hole has been drilled, remove the box containing the metallic dust taking care of no metallic dust falling on the electrical components.
c) Unscrew the claw nut from the high efficiency body mount antenna
d) Pass the cable through the 19mm hole carefully to avoid damage it with eventual cutting edge.
e) Screw the nut in the antenna leaving the cable at one side carefully
f) Tight the nut to ensure the antenna rubber seal closes perfectly and the claw nut scratches the cabinet metal to making a proper electrical contact.
g) Drive the antenna cable tidily to the gateway and smoothly screw it to the SMA connector.

### 5.8. Connecting the 24 PIN plug

The gateway has a 24 PIN female connector used to power it and to communicate with compressors and other devices.
In the installation box. There is a 24PIN male plug with 4-7 cables
Cables are the following
- PIN   1 - BLACK to be connected to the GROUND in the power supply
- PIN   1 - BLACK to be connected to the C in the RS485 for MODBUS
- PIN   3 - WHITE already connected to V9 connector (only in rep. cable)
- PIN   7 - WHITE to be connected to the (+) in the RS485 for MODBUS
- PIN  19 - WHITE to be connected to the (-) in the RS485 for MODBUS (Central pin in the rs485 plug)
- PIN  22 - WHITE already connected to V9 connector (only rep. cable)
- PIN  24 - RED to be connected to the +12V/+24V  in the power supply

The 24 PIN plug must be smoothly connected to the 24PIN connector making sure cables are not stressed and it is tightly locked.

### 5.9. Connecting to cloud via the Ethernet port (if required) NOT AVAILABLE YET

In the eventuality that it is impossible to use the GSM connectivity. iConn can be connected to the cloud using the Ethernet port.

a) Connect the iConn Gateway using a properly shielded Ethernet cable through the RJ45 port to the LAN router in the customer's network.
b) Configure the firewall to allow connectivity to and from https:industrials.iconn.gardnerdenver.com
c) Once physical connection is done, it will be required enable the connection in the iConn gateway as defined in paragraph XXXXXX

### 5.10. Connecting the Modbus cables to the controller/MODBUS line

If there is a MODBUS line with multiple equipment/compressors on it. Please previously follow the recommendations described on **5.1** .

Once the MODBUS network has been wired, or if we have just one compressor to monitor, we need to connect the iConn gateway to the RS485 port 1 at the controller closer to the gateway.

Wire the communication cable from 24PIN plug provided to the controller ensuring pinout is as described in the paragraph **5.1.** Use the tie wraps to keep wires tidy and safe allowing door being completely open.

The gateway should bring a three via RS485 plug. It should be directly connected to the Modbus-1 port in the back of the Delcos XL. In the eventuality that more than one compressor is installed, they must be connected in a BUS configuration
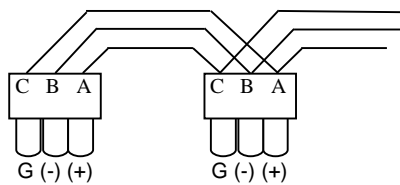
Any Delcos except
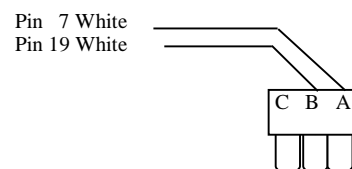Delcos XL& GD Pilot TS
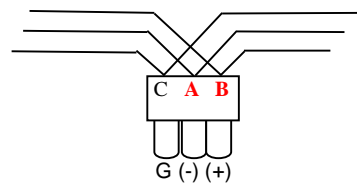
Delcos XL& GD Pilot TS

G
(-) cable  19 RS485 B
(+) cable  7  RS485 A

Wire G (Ground) is only required for very electromagnetic noisy environments or when connecting it to long MODBUS networks. For one single cotroller is not normally needed.

If the communication cable from the 24 PIN plug is not ended with an RS485, then it should be connected as follow:

Leave cable to allow open door

Pin  7 White
Pin 19 White

Except  Delcos XL & GD Pilot TS

## 5.11. Installing Power supply

The Pilot OWA3 Gateway comes with a 110V/230V AC power supply. It has be connected to a 110V- 220V within the cabinet whenever is possible.

When the unit comes with a backup battery (if supplied) the power supply used will be a current protected 30W one to ensure it can feed the initial current requirement during the period when battery is completely empty.

⚠ Please always follow the safety procedures when working on live systems.

a. Isolate the compressor
b. Identify a 100V/110V/220V/230V/240V source in the transformer in the electrical cabinet
c. Connect the BLACK PIN 1 of 24 PIN connector to the GROUND exit in the DC power supply
d. Connect the RED cable PIN 24 of 24 PIN connector to the +12V/+24V exit in the DC power supply. Make sure polarity is right. Swapped cables might damage permanently the gateway invalidating the warranty.
e. Connect the power supply with a proper cable to the 220/220 V source in the transformer. RED or BLUE colors are NOT recommended for AC.

   When the unit is supplied with a backup battery, It is important to feed the power supply from an AC source in the compressor (110V/220V Transformer). It will ensure that a power off alarm raises when losing power in the compressor.

   In the eventuality that no 220/2230V is not available inside the cabinet connect it to an external line.



| Connect DC to Power supply | Connect to AC (power off) | Power on+ 24 PIN reconnect |

## 6) Powering the iConn gateway

Once steps on paragraph 6) have been completed we can proceed to power the iConn gateway safely.

a. Double check AC connection and DC polarity
b. Switch on the AC power of the compressor/transformer.
c. Check with a AC voltmeter that voltage is within the range.(if out of the range see tolerances in datasheet of power supply)
d. Measure with a DC voltmeter that voltage is between 7V-52V DC

e. The iConn gateway should go now on the restart procedure

    i. The four LED (red, green, yellow, orange) light for two seconds
    ii. The Yelow LED lights for 10 seconds
    iii. The four LED (red, green, yellow, orange) blink once
    iv. All LEDs stay off during 60 sec
    v. Green LED blinks periodically or keeps steady
    vi. Orange LED blinks intermittently every 3 to 5 sec

The unit is working please contact the iConn central team to ensure any eventual additional configuration of the compressors and to ensure all compressors are transmiting data properly

## 7) Testing the System

### 7.1. Checking communication

Once the gateway has been installed, connected and powered, it will be required to check that compressors and gateway can communicate with the platform. It can be done by contacting the GD iConn service center or by login into the platform through a smartphone, tablet or pc with connection to internet
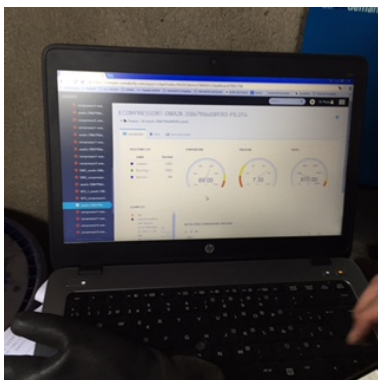


Check alarms and data

### 7.2. Checking alarms transmission

    a) Force an alarm in one compressor (i.e. press the emergency stop button).

    b) Repeat the same alarm or a different one in the rest of the compressors connected to the gateway. Alarms should be seen in the Web-frontend a few seconds afterwards.

    c) Force the compressor/s to run a few minutes. Pressure, temperature, and hour's data should appear in the Web-frontend.

## 8) Customer explanation of the system

- Explain the customer how the system works and confirm alarms data reception as per in the Customer Data sheet.
- Force an alarm in the system in front of the customer and confirm the person selected is receiving the alarm.

**Safety considerations**

# Danger !!

**When carrying out work on any compressed air equipment, you will come across many hazards.**
**Work on any part of a compressor system should only be carried out by authorised service personnel who are fully trained and competent.**
**You are obliged by law to understand any national or local safety rules and regulations.**

☐ Electricity – Always Lock Off, Tag Out & Prove Isolation of Mains Supply
☐ Air Mains System - Always Lock Off, Tag Out & Depressurize
☐ Always use Calibrated Test Equipment
☐ Beware of Hot Surfaces & Liquids
☐ Beware of Pressurised Gases & Systems – Observe Regulations
☐ High Noise Levels – Use Hearing Protection
☐ Heavy Assemblies – Use correct Manual Handling & Certified Lift Equipment
☐ Moving Parts – Do Not Remove Guards
☐ Chemical Safety – Observe COSHH Regulations
☐ Use of Correct PPE
☐ Observe all Warning Labels
☐ Observe all Posted Signs and Notices