

ITW GSE

7400 eGPU



Zero Emission

Battery-powered Ground Power Unit
Ideal for hangars and remote stands with
no fixed 400 Hz installations



For greener airports and
a better working environment

It's all about connections



CO₂ FOOTPRINT DURING TURNAROUND

Which piece of equipment would you exchange to create a greener environment?



IT'S THE GREEN WAY OR NO WAY

Airports all over the world are beginning to think greener. At the time of writing, almost half of global passenger traffic passes through Airport Carbon Accredited airports. The number of these airports is rapidly increasing, and more and more airports are interested in reducing their environmental impact. Often the world's largest airports are located next to major cities that are growing in line with global trends, meaning cities and airports are coming into ever-closer contact. This leads to stricter requirements in terms of the emissions local governments can and will accept.



BATTERY-POWERED GSE MARCHES FORWARD

To reduce emissions to airports, battery powered Ground Support Equipment is rapidly replacing diesel-powered equipment such as cargo loaders and pushback tractors. However, 400 Hz Ground Power Units are an even greater energy guzzler. More energy needs to be delivered over a longer time period. This is why ITW GSE's

groundbreaking and environmentally friendly 7400 eGPU is a game changer. A great benefit stands to be gained from replacing popular diesel-hungry GPUs and creating a better environment. Did you realize that savings would correspond to emissions in the range of approx. 88,000 kgs / 190,000 lbs of CO₂, 80 households, 50 cars or 100 acres of forest?

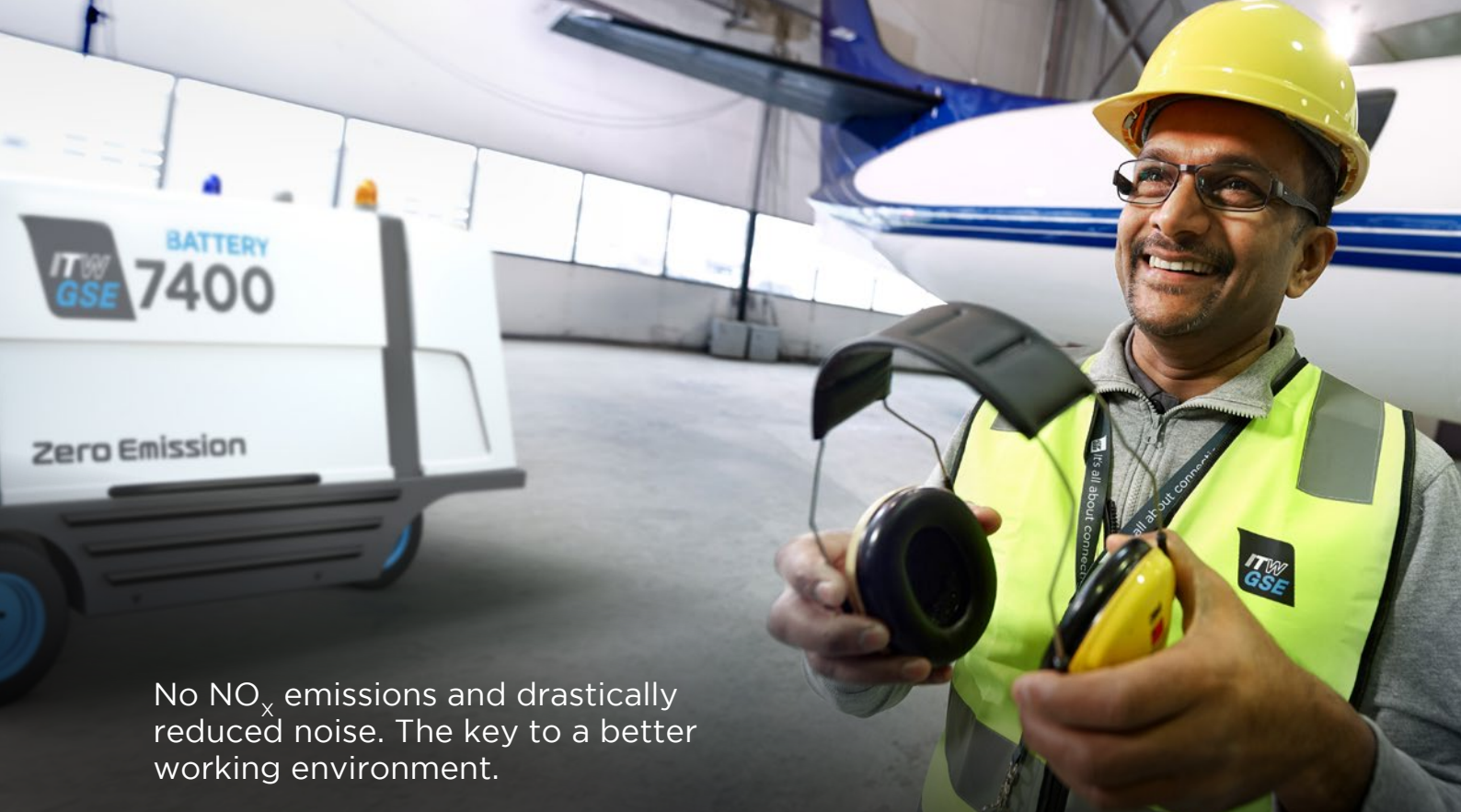
190,000 LBS CO₂

80 HOUSEHOLDS

50 AVG. CARS

100 ACRES FOREST

(Numbers are subject to change depending on country)



No NO_x emissions and drastically reduced noise. The key to a better working environment.

A GIANT LEAP FORWARD THAT LEAVES A TINY FOOTPRINT

WITH AN ITW GSE 7400 eGPU, YOU CAN REDUCE YOUR CO₂ EMISSIONS BY 90% AND NO_x EMISSIONS BY 95%

CO₂ EMISSIONS

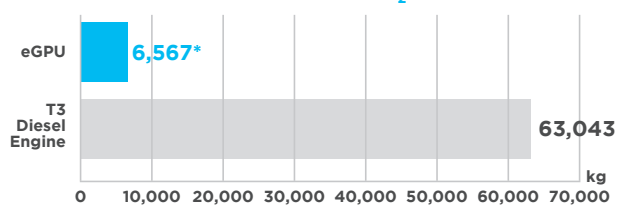
Diesel GPUs have high fuel consumption since they need to be constantly running at high engine speeds to generate the 400 Hz power an aircraft requires. This means high CO₂ emissions and high noise levels.

The ITW GSE 7400 eGPU is a zero-emission alternative that uses battery power instead of conventional diesel, meaning it is practically clean and silent.

NO_x EMISSIONS

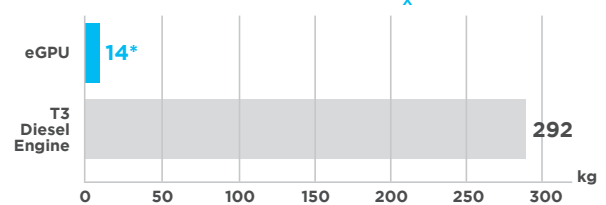
Diesel GPUs have a high level of NO_x emissions. The harmful health effects hereof are becoming increasingly better understood. The eGPU emits no NO_x into its operating environment, so it can contribute significantly to a cleaner and safer working environment for your employees.

OVERALL IMPACT ON CO₂ EMISSIONS



CO₂ emissions for 1 unit for 1 year (Avg. 5 ½ operating hours per day)

OVERALL IMPACT ON NO_x EMISSIONS



Annual NO_x emissions (Avg. 5 ½ operating hours per day)

*Calculated using average power plant emissions based on data from electricitymap.org

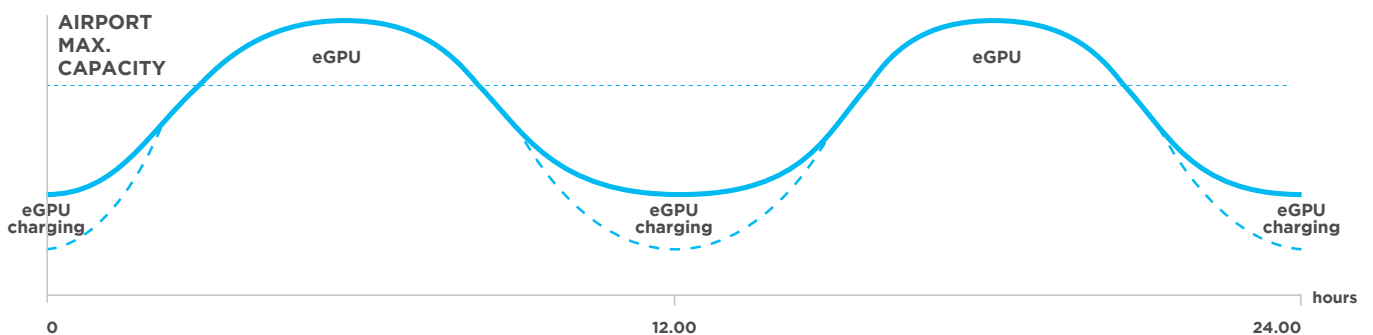
GROW THE CAPACITY OF YOUR EXISTING INFRASTRUCTURE



WITH THE 7400 BATTERY eGPUs

Airports frequently experience peak load periods with a consumption level very close to the power grid's maximum capacity. Increasing the grid capacity requires huge investments in infrastructure.

Making eGPUs a part of your airport's electrical infrastructure allows you to smooth out your capacity demands over a 24-hour period. The eGPUs can be charged during quiet periods and contribute to increasing total capacity in peak periods.

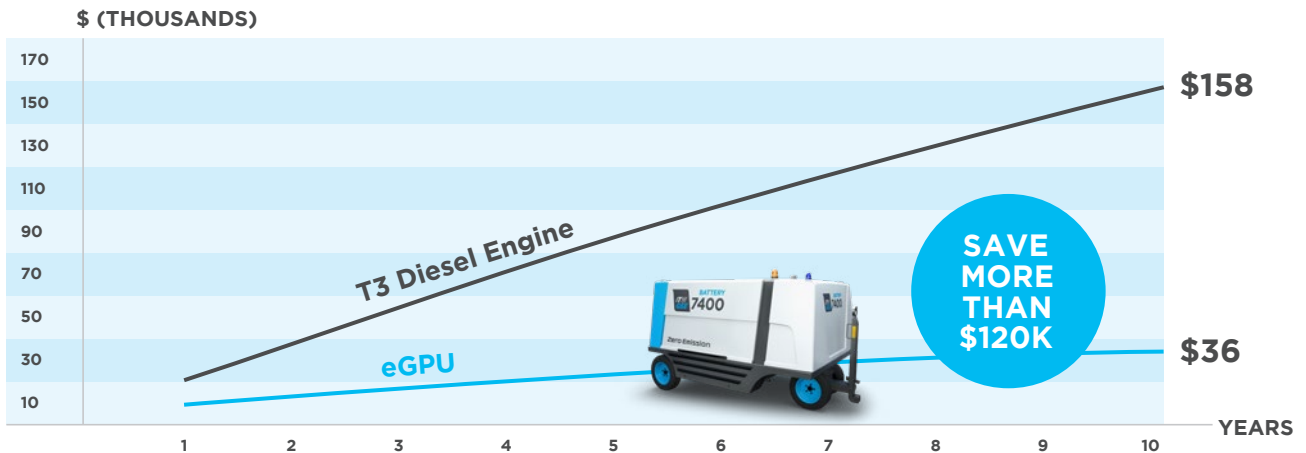


**eGPUs CAN MITIGATE OR ELIMINATE THE NEED FOR EXPENSIVE UPGRADES
OF AIRPORT INFRASTRUCTURE**

SAVE MORE THAN \$120,000 ON OPERATING EXPENDITURES

The 7400 GPU is a unique product with a green approach. Thanks to its lack of moving parts, vulnerable to wear and tear, maintenance costs are almost non-existent, meaning overall operating

costs stay low. With current electricity prices and maintenance costs, the eGPU is a clear winner in comparison to a diesel GPU.



CUMULATIVE OPEX - DIESEL ENGINE GPU VS eGPU

The graph shows the cumulative operating costs of a diesel GPU and an eGPU used 5 ½ hours/day/year. Lower electricity and maintenance costs make the eGPU a winner in this comparison. Provide your fuel and electricity prices for a customized calculation of *YOUR* savings.

FROM AMSTERDAM TO BRISBANE AND FRANKFURT TO LOS ANGELES

Environmentally conscious airports are already benefiting from the eGPU

In 2017, a desire to develop Schiphol airport's sustainability led to Nissan and ITW GSE carrying out a comprehensive test of a prototype eGPU based on Nissan Leaf battery technology in combination with an ITW GSE 2400 converter. The result was clear. After the test, Marcel van Beek, Manager for Process Innovation at Schiphol said:

“THE FUTURE LOOKS CLEAN AND BRIGHT”

The desire was for a quiet, zero-emission eGPU with light maintenance requirements and solid reliability that did not require retraining employees. The 7400 eGPU was the answer.

During Autumn 2018, the Royal Schiphol Group took the first eGPU into regular service. And so did FRAPORT, Brisbane Airport, United Airlines and customers in the UAE.



Plug & Play
Voltage
Compensation

Use in
hangars
- no input
power
cables

Mobile
GPU and
linepowered
converter
in one unit

On-Board
Charging
System

BC

Can supply
power and
recharge at the
same time

Recharge
from any
50/60Hz
standard
socket



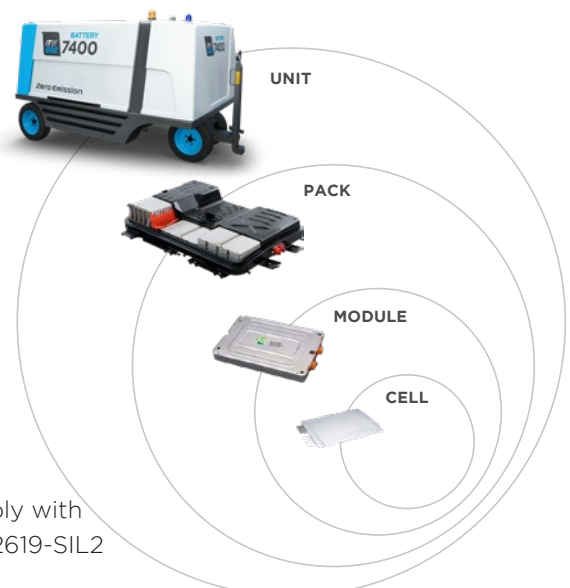
EXTREME FLEXIBILITY

The ITW GSE 7400 eGPU changes how airports think about ground power without making compromises. It is independent due to the onboard battery packs and can easily be transported to wherever it is needed. The flexibility of the 7400 eGPU provides the same outstanding, well-proven

features as other ITW GSE solid-state GPUs, including accurate and clean output voltage at the aircraft plug, and individual phase regulation of each output phase. It can perform multiple turnarounds before it needs recharging, and can be recharged from any standard 50/60Hz socket.

FOUR SHIELD SAFETY DESIGN

The ITW GSE 7400 eGPU has a four shield safety design. Each cell contains resistance for internal shorts circuit. The module can withstand deformation. The battery pack is fail-safe, and waterproof too. In testing, it can withstand free falls from a height of 6 meters (19.6 feet). And finally, the outermost layer is crush safe. It has a total of four shields which form an effective protective layer against hazardous impacts of a mechanical, electrical, and thermal nature.



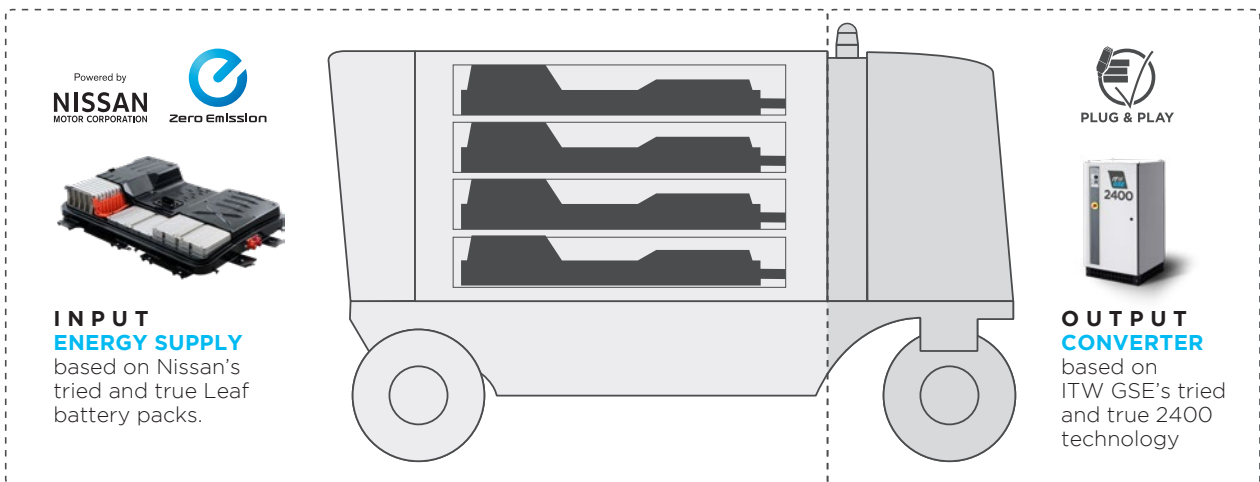
Comply with
EN 62619-SIL2

A WELL-PROVEN SOLUTION

THE ITW GSE 7400 eGPU COMBINES TWO KNOWN TECHNOLOGIES INTO ONE INNOVATIVE GPU

The ITW GSE 7400 eGPU is powered by 4 fourth-generation Nissan Leaf battery packs. Each pack has a capacity of 40 kWh. This is the same type of battery found in all Nissan-branded electric vehicles. Since 2010, over 400,000 of these vehicles have been sold, with close to 90,000 in 2018 alone.

At the output of the eGPU is ITW GSE's well-proven 2400 solid-state converter. This combination of two tried and true technologies has created the rock-solid eGPU. The eGPU is, of course, equipped with our patented Plug & Play system and can therefore deliver a unique voltage at the aircraft plug, right where it matters.



SAME EASY-TO-USE PLATFORM AS ALL OTHER ITW GSE PRODUCTS

Like all ITW GSE products, the 7400 eGPU has a common icon-based user interface that is as easy to use as a smartphone or a tablet. This means airport employees already familiar with one ITW GSE product can easily operate another, reducing human error during operation and making product training easier.

MODULAR DESIGN

Modular design is the hallmark of ITW GSE. The 7400 eGPU is built from modular components. This ensures fast replacement, servicing and spares communality.



SPECIFICATIONS

ITW GSE 7400 eGPU



Input

- Charger input range:
3 phased @ 260-520 V / 45-65 Hz

Charging Time :

Pre-Fuse			
16 A	32 A	63 A	125 A
< 15 h	< 8h	< 4 h	< 3 h

Values based @ 3x400 V and 20°C ambient

Output

- Rated power: 90 kVA PF 0.8-1
- Voltage: 3 x 115/200 V
- Frequency: 400 Hz \pm 0.1%
- Power factor: 0.7 lagging to 0.95 leading
- Voltage regulation:
<0.5% for balanced loads and up to 30% for unbalanced loads
- Voltage recovery: Δ <8% and recovery time<10 ms to 100% load change
- Total harmonic content:
<2% at linear load (typically 1.5%)
<2% at non-linear load according to ISO 1540
- Crest factor: 1.414 \pm 3%
- Voltage modulation: <1.0%
- Phase angle symmetry:
120° \pm 1° for balanced loads
120° \pm 2° for 30% unbalanced loads

Protection

- Protection class: IP55
- No break power transfer
- Over/under voltage at output
- Overload
- Internal high temperature
- Control voltage error
- Short circuit at output
- Plug insertion interlock
- Neutral voltage supervision
- Neutral voltage displacement
- Leakage current supervision

Overload Ratings

- As per ISO 6858:2017- type 1 equipment

Weight

- Mobile unit: 2,100 kg (4,630 lbs)

Turnarounds as Function of Time and Aircraft

Based on average measured consumption. Subject to aircraft configuration.		4 Packs (160 kWh)		
		Time at gate in minutes		
		40	60	80
Aircraft Narrow Body 1 x 90 kVA Unit	CRJ-900LR	16	11	8
	A320-200	15	10	9
	A321-200	8	5	4
	B737-800	10	6	5
Aircraft Wide Body 2 x 90 kVA Unit	A340		6	5

Depending on ambient conditions and usage, the capacity can be expected to derate up to 30% over 10 years

Norms and Standards

- DFS400 Specification for 400 Hz Aircraft Power
- MIL-STD-704F Aircraft Electric Power Characteristics
- SAE ARP 5015 Ground Equipment - 400 Hertz Ground Power Performance Requirements
- ISO 6858:2017 Aircraft Ground Support Electrical Supplies
- EN 62619:2017 Safety Requirements for Li-Ion Batteries
- UN38.3 Certified Battery System
- EN 62040-1-1 General & Safety Requirement
- EN 61558-2-6 General & Safety Requirement
- EN 61000-6-4 Electromagnetic Compatibility Generic Standards - Emission Standard
- EN 61000-6-2 Generic EMC Standards
- EN 1915-1 & 2 Machinery; general safety requirements
- EN 12312-20 Machinery; general safety requirements

Environmental

- Operating temperature:
-10°C to 45°C (14°F to 113°F)
without additional heating/cooling.
For other operational temperatures, please contact ITW GSE
- Relative humidity: 10-100%
- Noise level: <65 dB(A) @1 m
- typically 60 dB(A)

Efficiency

- 400 Hz converter and charger part
> 0.95

Miscellaneous

- MTTR: max. 20 minutes
- Color: RAL 7035, Light grey (standard)
Trailer: RAL 7043, Traffic Grey
Rear cover: Pantone 2393, Cleantech Blue

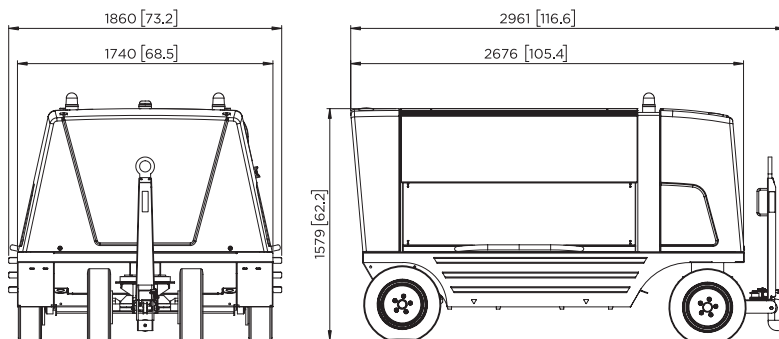
Standard Features/Equipment:

- Plug & Play automatic voltage compensation
- Adjustable max. input current settings (e.g. 16 to 125 A in steps of 1 A)
- Beacon for operation/charging*
- Beacon for warning/low battery* incl. sirene
- Towbar interlock (non-lock version)
- Simultaneous charging while supplying 400 Hz power

*Color acc. to customer specification

Standard Options Available

- Dual 400 Hz output (excludes ARU option)
- 28 VDC / 600 A ARU (Automatic Rectifier Unit) Simultaneous usage 45 kW(AC) + 300 A (DC)
- Input cable and plug according to clients specifications
- 4 x 50 mm² output cable (AWG 1/0) (recommended)
- Lockable towbar interlock
- Towbar with DIN40 towing eye
- White clearance light
- TrackUnit incl. APP & Data Manager (data/location over GSM/GPS)
- Ability to power the 7400 from another GPU in case of unexpectedly long turnaround time
- Forklift pocket for transportation



Dimensions are shown in mm and [inches]

Specifications are subject to change without prior notice



It's all about connections



ITW GSE

7400 JetEx 28 VDC eGPU

Battery-powered Ground Power Unit
Ideal for hangars and remote use



Zero Emission



Large battery capacity
allowing numerous engine starts

It's all about connections



EXTREME FLEXIBILITY

Single
or 3-phase
input voltage

Ideal for
hangar use.
No emissions
and low noise
level

Mobile
GPU and
line-powered
converter
in one unit

On-Board
Charging
System

BC

Can supply
power and
recharge at the
same time

Recharge
from any
50/60Hz
standard
socket



INDEPENDENT AND POWERFUL

The 28 VDC JetEx eGPU is independent due to the onboard battery. Powerful enough to perform at least 100 engine starts on a full charge, the 7400 JetEx is the ultimate in battery driven units. It can even be charged while delivering power to an aircraft.

This innovative eGPU can be used for engine starts, ramp operations and test of avionics.

BUILT TO LAST

Modular design is the basis of ITW GSE design and the 7400 eGPU is no exception. Components are well organized thus ensuring fast service and repair. The eGPU has no rotating parts, subject to wear and tear and is therefore practically maintenance free. The overall result is a very reliable and dependable GPU that is built to last. The eGPU is furnished with a weatherproof steel cabinet, mounted on a pneumatic tire trailer that can easily be towed.

EQUALLY IDEAL FOR HANGAR AND REMOTE USE

Quiet and emission free operation is what you get with the 28 VDC JetEx eGPU. The unit is autonomous and can be in use for long periods of time before it needs recharging. These qualities make this eGPU ideal for hangars and remote use.

ADJUSTABLE VOLTAGE

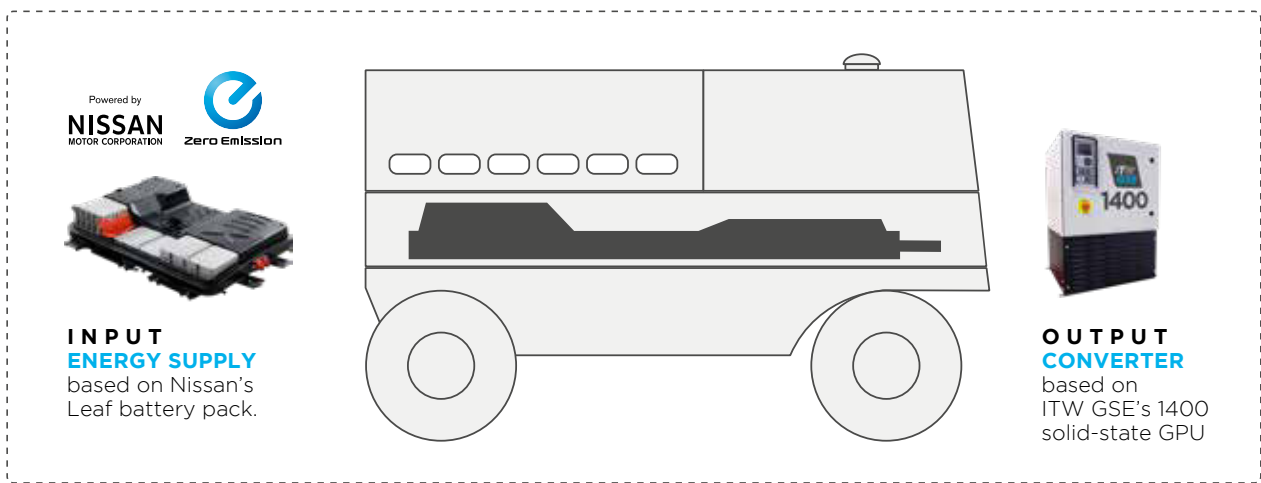
To ensure the best voltage quality at the aircraft plug, the operator can adjust the voltage compensation via the set-up menu in the user interface. The compensation can be done automatically via feed-back from the F-signal or it can be manually set. Also, the 7400 JetEx offers Line Drop Compensation, Current Limit (300 to 2000 Amps). Those features can easily be configured and provide the operator unprecedented flexibility for ramp and hangar operation.

A WELL-PROVEN SOLUTION

THE ITW GSE 7400 JetEx 28 VDC eGPU COMBINES TWO KNOWN TECHNOLOGIES INTO ONE INNOVATIVE GPU

The JetEx eGPU is powered by a 4 fourth-generation Nissan Leaf battery pack with a capacity of 40 kWh. The same type of battery as in all Nissan-branded electric vehicles. Since 2010, over 400,000 of these vehicles have been sold, with close to 90,000 in 2018 alone.

At the output of the eGPU is ITW GSE's well-proven 28 VDC solid-state converter. This combination of two tried and true technologies has created the rock-solid eGPU.



SAME EASY-TO-USE PLATFORM AS ALL OTHER ITW GSE PRODUCTS

Like all ITW GSE products, the 7400 JetEx eGPU has a common icon-based user interface that is as easy to use as a smartphone or a tablet. This means airport employees already familiar with one ITW GSE product can easily operate another, reducing human error during operation and making product training easier.



SPECIFICATIONS

ITW GSE 7400 JetEx mobile 28 VDC eGPU



Input

- Charger Power: 15 kW @ 3-phase
5 kW @ 1-phase
- Charger input voltage range:
3 phase @ 260-530 V / 45-65 Hz
1 phase @ 170-300 V / 45-65 Hz
- Maximum pre-fuse: 50 A

Output

- Current: 600 A continuously
- Engine Start Capability: 2400 A
Voltage: 28 VDC (or as adjusted)
- Ripple: less than 2% at full load
- Voltage regulation:
<0.5% from no load to full load
- Voltage compensation:
3 V @ 600 A
Manual or voltage feed-back
via interlocks

Weight (Without cables)

- Mobile unit approx.
740 kg (1630 lbs.)

Environmental

- Operating temperature:
-10°C to 45°C (14°F to 113°F)
without additional heating/cooling.
For other operational temperatures,
please contact ITW GSE
Relative humidity 10-100%
- Noise level: <65 dB(A)@1m
- typically 60 dB(A)

Overload ratings

- 600 A continuous use
- 1200 A for 30 seconds
- 1800 A for 10 seconds
- 2100 A for 5 seconds
- 2400 A for 2 seconds

The ITW GSE 7400 JetEx eGPU is well suited to cover the power need for aircraft like the following:

- Cessna Citation
- Beechcraft
- Gulfstream G250
- Dassault FalconJet
- ATR 42 & 72
- Bombardier Q Series / Dash 8

Standards

- ISO 6858 Aircraft ground support electrical supplies
- General requirements
- MIL-704F Aircraft electric power characteristics
- EN 12312-20 (Machinery - Specific safety requirements)
- EN 60204-1 (Machinery - Electrical safety)
- EN 62040-1-1 LVD - Safety standards
- EN 61558-2-6 LVD - Safety standards
- EN 61000-6-2 EMC - Immunity standard
- EN 61000-6-4 EMC - Emission standards
- AHM 907 Guidelines for electric powered GSE (e-GSE)

Miscellaneous

- MTTR: max. 20 minutes
- Communication: TCP/IP, USB

Protection

- Protection class: IP55 (electronic section)
- Over/under voltage at in/output
- Over temperature
- Internal voltage error
- Short circuit at output
- Trip in case that:
 - U<20 VDC for more than 4 seconds
 - U>32 VDC for more than 4 seconds
 - U>40 VDC for more than 150 ms

Options

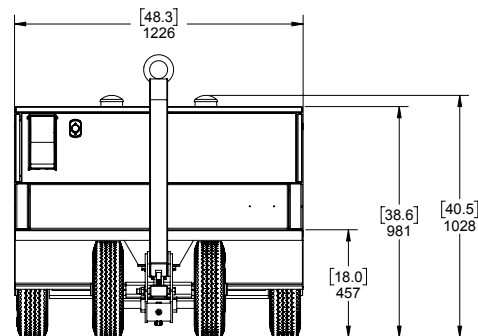
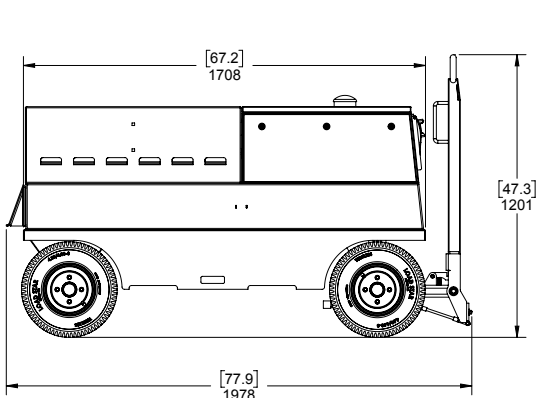
Output cables upon request

Standard Features/Equipment

- Beacon* for operation/charging
- Beacon* for warning/ low battery incl. siren
*Color: specify yellow, blue, red or green
- Simultaneous charging while supplying 28 VDC power

Standard Options Available

- Input cable and plug according to clients specifications
- Towbar with DIN40 towing eye
- Monitoring over GSM/GPS



Dimensions are shown in mm and [inches]

