

# Filter Fan Unit Integrated Recirculation and Cooling Type IRC-EC

Technical Concept



## Product Description

Filter Fan Units Integrated Recirculation and Cooling (FFU-IRC) are suited for the equipment of entire cleanroom ceilings and are particularly suited for cleanroom areas with significant room heights and limited return air space.

The FFU-IRC is exclusively used in „turbulent“ cleanrooms with max. 50 % filter coverage. Due to integrated, space saving return air ducts no additional return flow areas in the form of return air shafts and raised floors in the building are needed.

The FFU-IRC is designed for a vertical airflow in the cleanroom with an air inlet and outlet on the cleanroom ceiling. In both of the integrated return air ducts 100 % of the room supply air is led through a return air cooler back to the fan. Thus the FFU-IRC is a complete, local recirculation cooling device.

Through the optional nozzle DN 200 at the top of the device external air can be supplied when required for the fresh air supply, the maintenance of positive pressure within the cleanroom and the humidity control. Special baffles at the FFU separate the return flow area from the supply air so that a short circuit flow is prevented.

A clean room class 5.0 to 8.0 according to DIN EN ISO 14644-1 can be achieved with the selection of the filter coverage percentage, volume flow and variable filter classes.

The brochure at hand provides information about the device design

- FFU-IRC-EC - FFU with EC-motor and advanced control and monitoring possibility.

## Technical Data

Grid size <sup>1)</sup>	mm	1 200 × 1 200	
Housing length Installation rails	mm	1 140	
Housing width Installation rails	mm	1 140	
Housing height	mm	950	
Housing material standard		Aluminium untreated	
Weight with filter	kg	80	
EC-Motor (IP20)		FFU-IRC EC	
Voltage /Phase	V/ph	200–277 / 1	
Frequency	Hz	50/60	
Nominal current	A	1,8–1,3	
Nominal power	W	370	
Rotation speed min./max.	1/min	300–1304	
Operation temp. min./max.	°C	0/+40	
Air velocity (supply air)	m <sup>3</sup> /h	1 750	2 333
Power consumption	W	133	229
Pressure side sound power level	dB(A)	55	61
Sound pressure level in the cleanroom			
– 10 % coverage	dB(A)	53	58
– 25 % coverage	dB(A)	55	60
– 50 % coverage	dB(A)	58	64
Cooler			
Cooling capacity	kW	2,2	2,7
Media volume flow	m <sup>3</sup> /h	0,5	0,6
Water temperature			
– inlet	°C	14	14
– outlet	°C	18	18
Waterside pressure drop	kPa	4,12	5,9
Max. admissible differential pressure	kPa	26	26
Air temperature			
– inlet	°C	23	23
– outlet	°C	19,2	19,5
Airside pressure drop	Pa	9	15
1) Special size upon request			

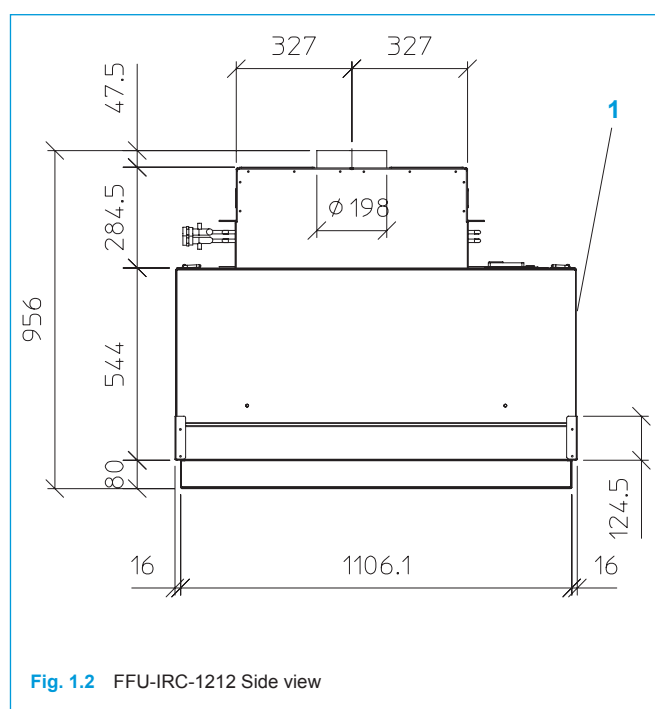
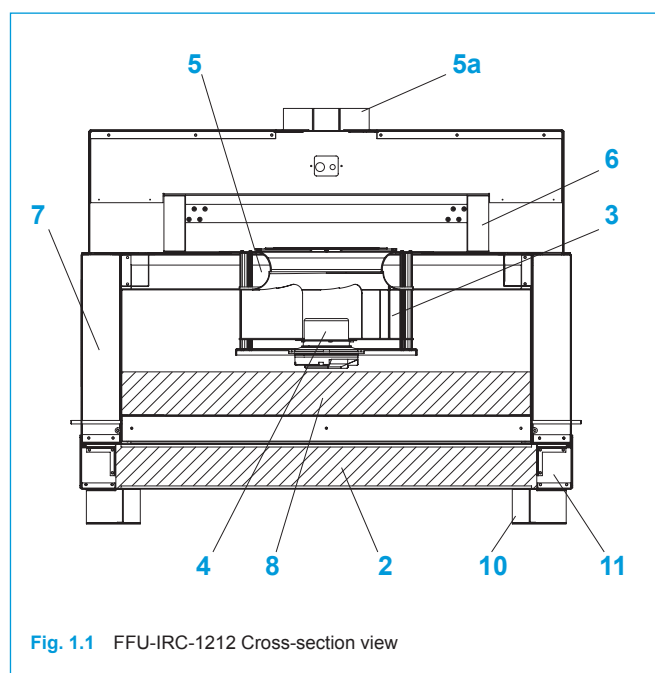
## Design and Function

The unit consists essentially of the housing **1**, the compact fan unit **3** with inlet nozzle **5**, motor **4**, cooler **6** and the HEPA filter cell **2** with a filter bearing frame **11**. Special deflectors **10** prevent a short circuit flow of supply air directly into return air. An admixture of fresh air is done via a nozzle **5a**. The sound absorber **8** reduces fan noise.

Filter cell class H13 to U17 can be used, if required.

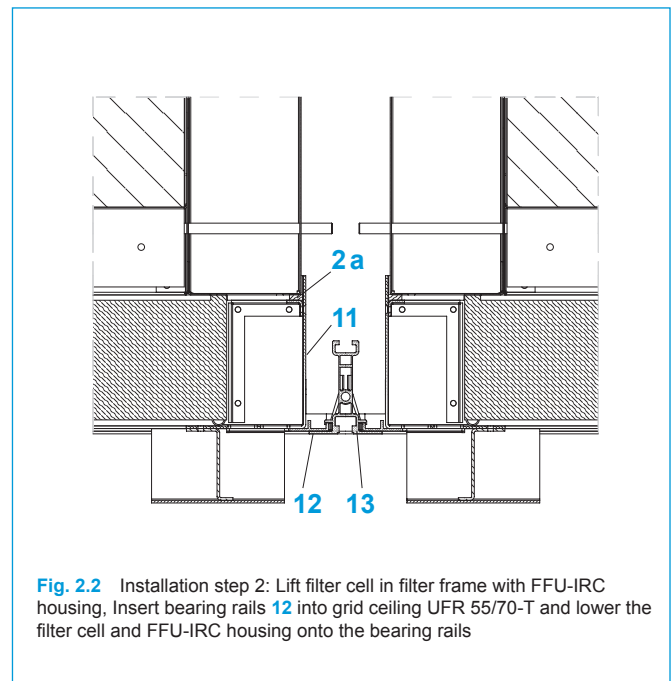
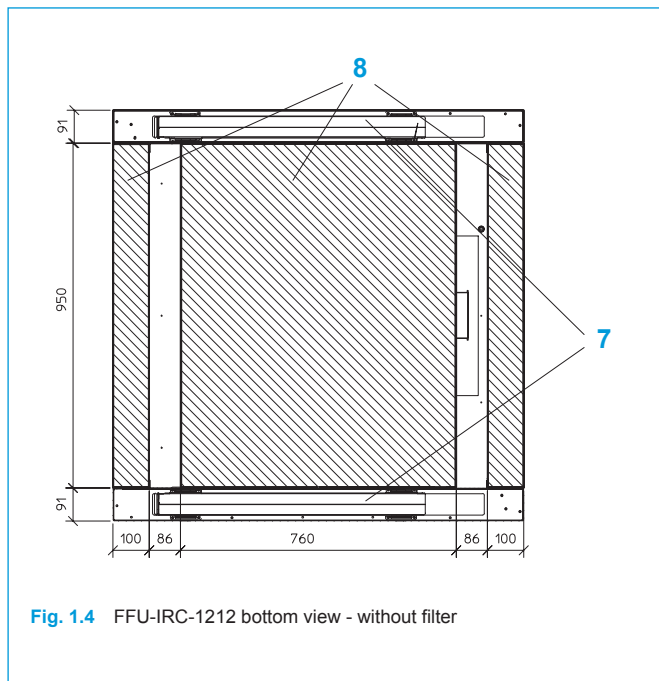
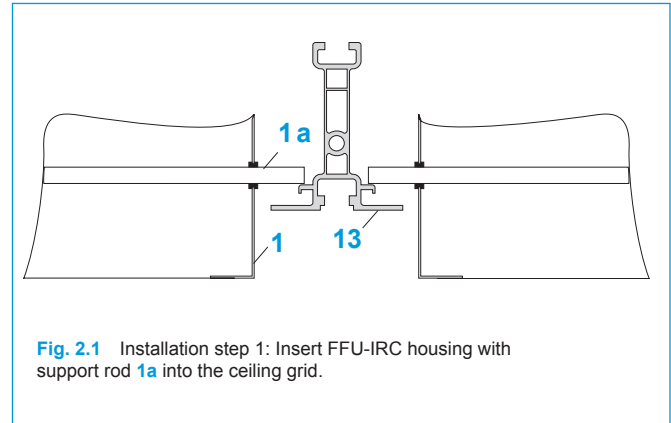
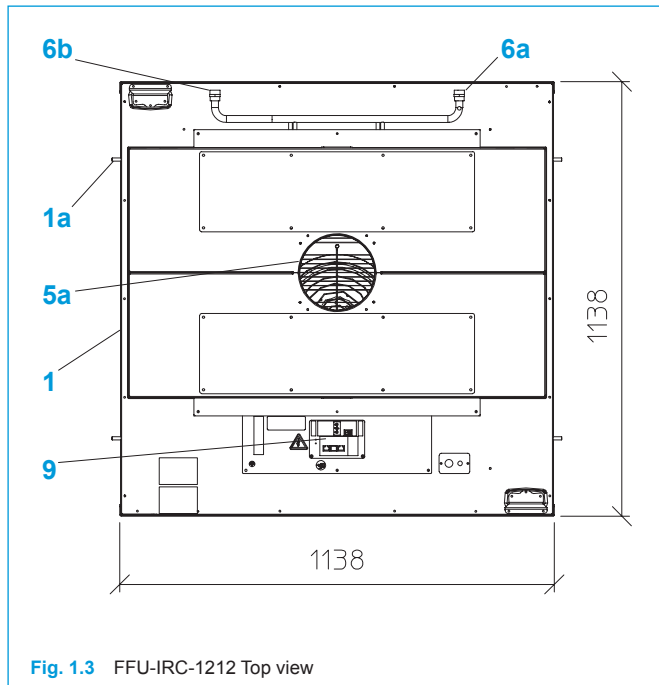
The FFU-IRC-EC is driven by a radial fan with backwards curved blade wheel and electronically commutated external rotor motor.

## Dimensions



## Device Installation

The installation into the Exyte Technology ceiling system → Ultraflex Grid Ceiling is very simple. The Installation can take place from the cleanroom, using the ceiling grid system UFR-55/70-T **13** with bearing rails **12** (Abb.2.2). FFU and filter cell with bearing frame are installable independently of each other from the cleanroom side. The sealing between the housing and the filter cell frame is done with a dry sealant **2a** (Abb. 2.2).



### Legend

- |  |                                     |
|--|-------------------------------------|
| <b>1</b> Housing                                     | <b>6a</b> Cooling water flow line   |
| <b>1a</b> Support rod                                | <b>6b</b> Cooling water return line |
| <b>2</b> HEPA filter cell                            | <b>7</b> Return air duct            |
| <b>2a</b> Dry seal                                   | <b>8</b> Sound absorber             |
| <b>3</b> Impeller                                    | <b>9</b> Terminal box               |
| <b>4</b> Motor                                       | <b>10</b> Air outlet deflector      |
| <b>5</b> Inlet nozzle                                | <b>11</b> Filter bearing rail       |
| <b>5a</b> Nozzle for fresh air proportion (optional) | <b>12</b> Bearing rail              |
| <b>6</b> Air cooler                                  | <b>13</b> Ceiling grid UFR-55/70-T  |

## Control

### FFU-IRC-EC

Based on LON (Local Operating Network) the FFU-IRC are merged to one network through a special bus-system → Control System DC. This enables a simple and individual speed adjustment and monitoring of each unit, even in complex systems with several thousand units.

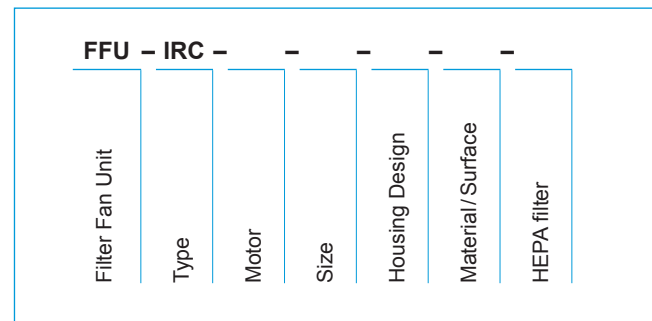
## Power Supply

A plug & play cable system for the power supply is available. Each unit is connected through the existing terminal box 9, minimizing the installation efforts.

## Key Features

- Filter Fan Unit with integrated return air cooler for high, turbulent cleanrooms
- Air cooling takes place through an integrated heat-exchanger
- System sizes fit in ceiling grid size  
1200 mm × 1200 mm, other sizes on request
- Low power consumption, low sound pressure level
- Easy operation, low maintenance efforts
- Aluminium housing (standard),  
different designs on request
- HEPA filter classes H13 to U17 (standard: H14)
- Installed radial fan:  
Motor with internal wired thermal contacts
- FFU-IRC EC with electronically commutating external rotor motor, volume flow adjustable through  
→ Control System DC
- Minimized power supply installation effort due to plug & play cable system
- Easy device installation from below (cleanroom side) with bearing rails from Exyte Technology, optionally installation from top (plenum side).

## Type Designation



<b>Type</b>	
<b>IRC</b>	Integrated Recirculation and Cooling
<b>Motor</b>	
<b>EC/LR</b> .....	EC-Motor with LON RS485-interface
<b>EC/LF</b> .....	EC-Motor with LON FTT10A-interface
<b>EC/MW</b>	EC-Motor with MW Bus-interface
<b>Size</b> (ceiling grid)	
<b>1212</b>	1200 mm × 1200 mm
<b>Housing Design</b>	
<b>T</b>	Installation into dry-ceiling with bearing rails
<b>So</b>	Installation into non Exyte Technology built ceiling (special design)
<b>Material/Surface</b>	
<b>AU</b>	Aluminium untreated (Standard)
<b>AE</b>	Aluminium anodized
<b>HEPA filter</b>	
<b>H14</b>	Standard filter class
<b>Optional</b>	
—	Filter classes H13, U15, U16, U17

## Submittal Text

\_\_\_ pcs. of FFU-Integrated Recirculation and Cooling-EC for turbulent cleanrooms, consisting of:

- Housing with sound absorber, non-flammable according to class A2 according to DIN 4102 and integrated return air conveyance
- High performance radial fan with backwards curved blades. The impeller is directly connected with the drive shaft of the EC motor. The motor is maintenance free. Fan impeller and motor are statically and dynamically balanced.

### Technical Data

#### Component size 1200 mm × 1200 mm

Length × Width . . . . .	1 140 mm × 1 140 mm
Total installation height (incl. Hepa filter) . . . . .	950 mm
Weight per FFU . . . . .	80 kg
Operating voltage . . . . .	200–277 V/1 ph
Frequency . . . . .	50/60 Hz
Nominal current . . . . .	1,8–1,3 A
Nominal power . . . . .	370 W
Rotation speed min./max. . . . .	300–1304 1/min

### Operational Data

Volume flow . . . . .	1750 m <sup>3</sup> /h	2333 m <sup>3</sup> /h
Power consumption . . . . .	133 W	229 W
Pressureside sound power level. . . . .	55 dB(A)	61 dB(A)
Sound pressure level in the cleanroom		
- 10 % coverage . . . . .	53 dB(A)	58 dB(A)
- 25 % coverage . . . . .	55 dB(A)	60 dB(A)
- 50 % coverage . . . . .	58 dB(A)	64 dB(A)
Cooling capacity . . . . .	2,2 kW	2,7 kW
Media volume flow . . . . .	0,5 m <sup>3</sup> /h	0,6 m <sup>3</sup> /h
Cooling water temperature		
- inlet . . . . .	14 °C	14 °C
- outlet . . . . .	18 °C	18 °C
Waterside pressure drop . . . . .	4,12 kPa	5,9 kPa
Max. admissible differential pressure		26 kPa
		26 kPa
Air temperature		
- inlet . . . . .	23 °C	23 °C
- outlet . . . . .	19,2 °C	19,5 °C

#### HEPA filter

- Class H14
- Class \_\_\_\_\_

#### Housing Material

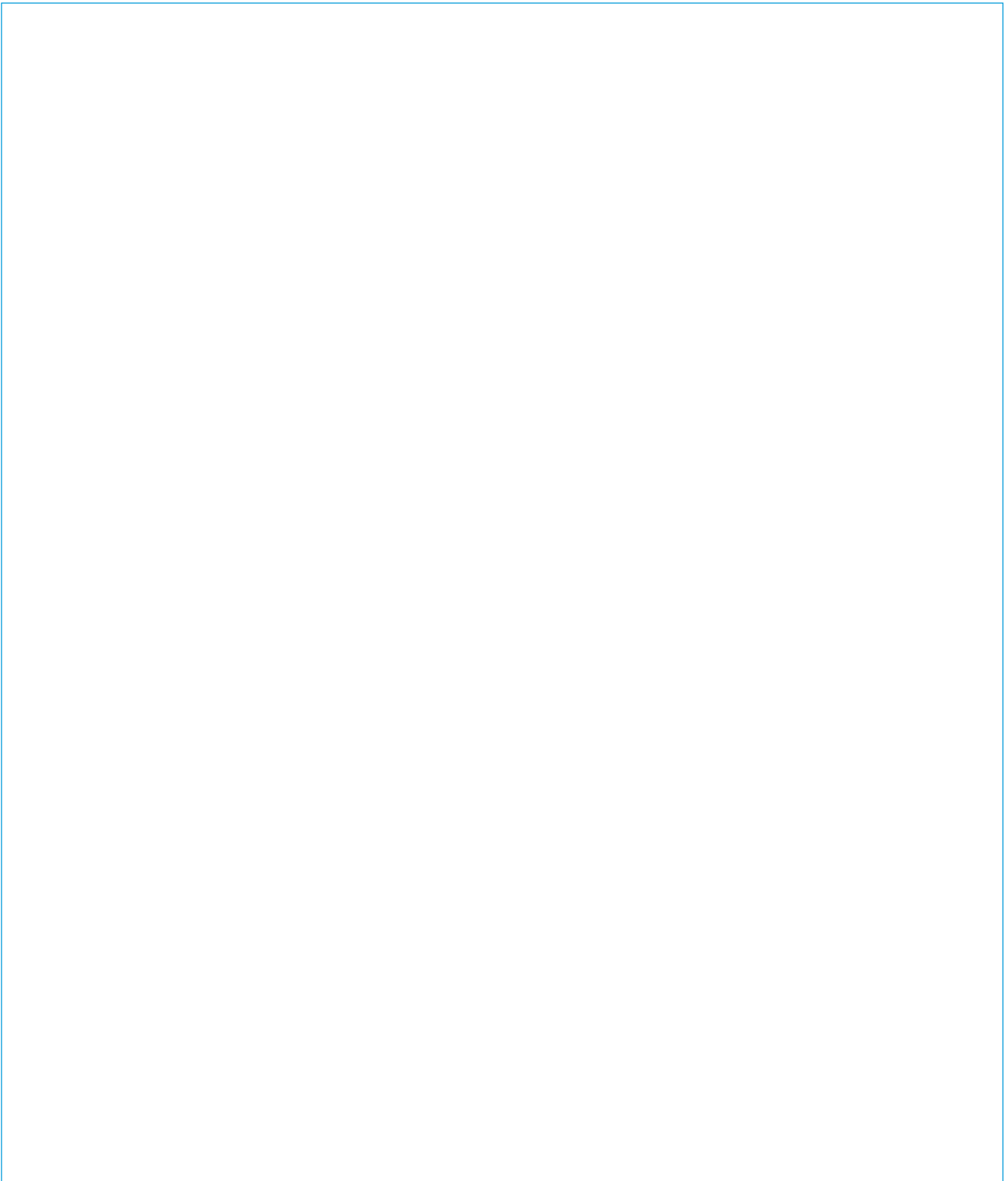
- Aluminium untreated (standard)
- Aluminium anodized
- Aluminium filter frame with powder coating similar to RAL 9010

#### Ceiling profile grid-ceiling

- UFR-55/70-T
- Other ceiling profile

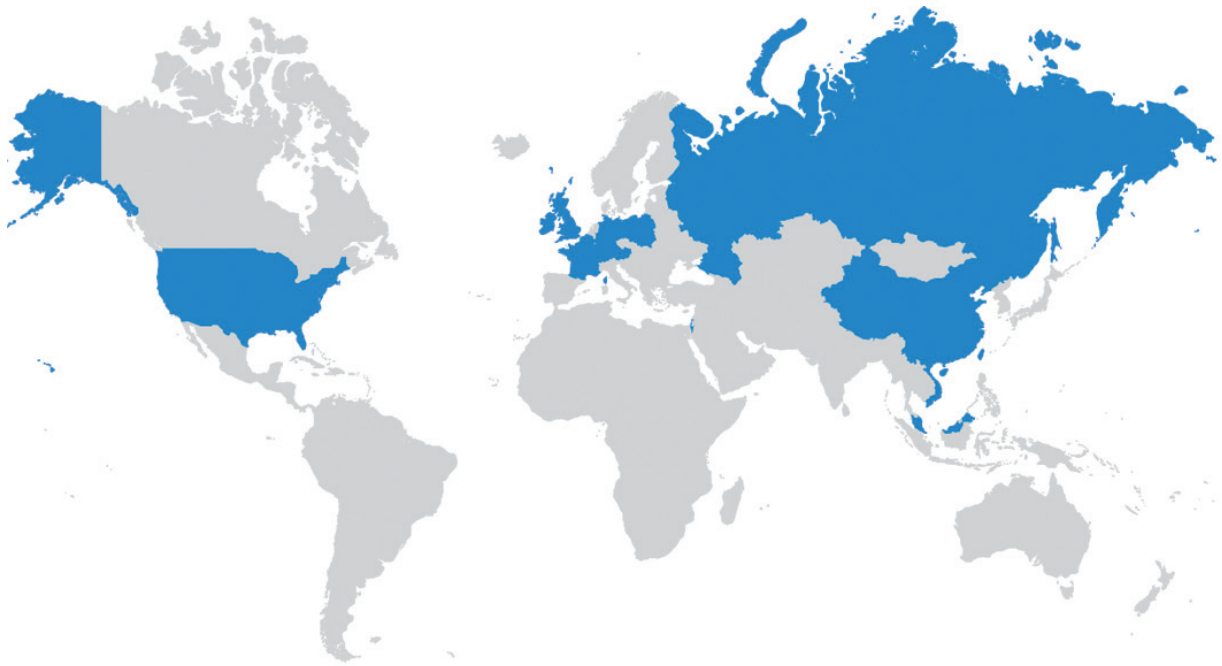
**Manufacturer**    **Exyte Technology GmbH**  
**Type**                FFU-IRC-EC-\_\_-\_\_-\_\_-\_\_

## Notes





# Local Support Wherever You Need Us



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