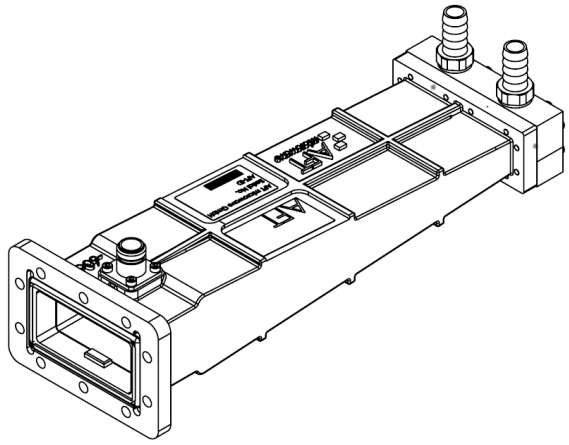

- Solid-state ferrite absorber, water cooled
- Broadband & temp.-stable absorption
- Excellent peak & average power capability
- Cooling water separated from the RF avoiding water to enter the waveguide
- High reliability & long life-time
- Free of maintenance & wear parts
- RoHS compliant
- Designed for S-band LINACs operating at 2856 MHz and 2998 MHz

Parameter	Value			
Footprint Drawing No.	FP-10073544			
Product Type	RF Load			
Configuration	Ferrite load			
Center Frequency f_0	2856 MHz and 2998 MHz			
Bandwidth BW	± 10 MHz			
Input Power	**Options:**	**Xp = 1**	**Xp = 2**	**Xp = 3**
Input Peak Power		4 MW	6 MW	35 MW
Input Average Power		4 kW	6 kW	6 kW
Return Loss	≥ 30 dB			
VSWR	< 1.065			
RF Waveguide	WR284			
RF Flanges / Connectors	CPR284G, grooved, 10 holes ∅ 6.5 mm			
RF Coupling Probes	1x non-directional coupling probe at input			
	Coupling: -60dB ± 2dB, Connector type: N-female			
Cooling System	demineralized water			
Water Tube Materials	Stainless steel			
Water Connectors	2x ½” hose barb fittings, stainless steel			
Water Inlet Temperature (nominal)	selectable between 20°C and 40°C			
Water Inlet Temperature Range	± 5°C			
Water Flow Rate	≥ 600 l/h @ 6kW, ≥ 400 l/h @ 4kW			
Water Pressure Drop	< 2 bar @ 600 l/h			

Water Inlet Pressure	≤ 10 bar	
Water Leak Test Pressure	15 bar for 10min	
Waveguide Dielectric Filling Gas	SF6	
Gas Pressure	nominal:	3 bar absolute
	maximum :	4 bar absolute
Gas Leak Rate (Helium)	< $5 \cdot 10^{-4}$ mbar l/s	
	tested with Helium pressurization at 2.5 bar gauge	
Ambient Temperature	operating :	10°C to 40°C
	storage :	0°C to 60°C
Relative Humidity	< 80%, non-condensing	
Magnetic Stray Field	device must not be exposed to magnetic stray radiation of >5G	
Body Material	Aluminium	
Surface Finish	none	
Dimensions	see footprint drawing	
Weight	2.5 kg ± 10%	
Mounting Orientation	any	
Accessories included	1x metallic gasket p/n 1-0002998000-000	

Ordering Code

LF-WR284-02-2927 - Xp - Xw

Variable	Description	Value Options		
Xp	Input Power Option	**1** : 4 MW / 4 kW	**2** : 6 MW / 6 kW	**3** : 35 MW / 6kW
Xw	Water Inlet Temp. [°C]	**20 .. 40**		

Notes:

1 Ferrite Load Concept: The concept of this ferrite load is based on the RF absorption of lossy solid-state ferrites. The ferrites are bonded to the broad walls of the waveguide by using a temperature-resistant adhesive. The waveguide walls are formed by brazed water cooling structures made of stainless steel, allowing for a very efficient cooling. This configuration has major benefits compared to conventional water loads:

- □ Broadband, temperature- and power-stable RF absorption.
- □ Stable input return loss performance vs. RF power, both in magnitude and phase.
- □ Excellent peak power capability due to solid-state nature of ferrites.
- □ Cooling water is clearly separated from the RF section by the brazed cooling structure, safely avoiding water to enter the waveguide section.
- □ RF absorption is independent of water quality and coolant mixture.
- □ Reliable adhesive bonding of ferrites with low thermal resistance & high thermo-mechanical robustness.
- □ Robust design for high reliability and long life time.
- □ The device is basically free of maintenance and does not include wear parts.

2 Water Cooling: There is a water cooling circuit with a designated water inlet and outlet connector. Water quality, temperature, flow, and input pressure need to be controlled carefully according to the specified values. Air bubbles in the cooling channel have to be avoided.
The requirement for demineralized water is based on the exclusion of deposition and agglomeration of mineral salts, calcium carbonate or rust in the cooling channels. There are no specific requirements for the water resistivity.
The cooling channels must not be contaminated by sealants such as PTFE tape or hemp fibers. These can decrease cooling significantly or even block cooling channels.
For reason of protection, the device requires sensorics with RF interlocks for specified water temperature, water flow, and water inlet pressure. The corresponding equipment is to be provided by the customer.
Note: Water has to be carefully drained from the cooling circuit before transport and storage, in order to avoid possible damage by freezing of water.

3 Low-Power Factory Tests: The following tests will be performed at the AFT factory before shipment:
(1) small-signal network analyzer measurements of return loss vs. frequency at room temperature of 22°C ± 4°C.
(2) Water pressure and leak test.
(3) Visual inspection.
(4) Helium gas leak rate test.

4 Documentation: An owner´s manual is supplied for providing information on the installation, operation and maintenance of the device. The documentation will also include specification, footprint drawing, an inspection report, and the RF test results as viewgraphs of S-parameters vs. frequency.

Rev.	Remark	Date	Name
00	Initial	17.08.2015	C. Weil
01		17.09.2015	C. Weil
02	Flow rate, weight, documentation	03.04.2020	C. Weil
	New logo, notes updated	19.02.2024	C. Weil