



- Compact 3-port T-junction ferrite isolator including water load
- High performance ferrites from in-house production
- Excellent power capability covering operation into 100% reflective load, any phase
- Low insertion loss and high isolation
- Robust and reliable design
- RoHS compliant

Parameter	Value
Footprint Drawing No.	3-126910-FP
Product Type	Isolator
Configuration	3-port
RF Transmission Line	Waveguide
Set-up	Ferrite circulator with integrated water load
Orientation of Rotation	Clockwise
Center Frequency f_0	2450 MHz
Bandwidth BW	± 25 MHz
Forward Power (cw) - Options	1 kW 2 kW 3 kW
Reverse Power	100% of forward power, at any phase
Insertion Loss (Port 1-2)	≤ 0.2 dB at f_0 ≤ 0.2 dB in BW
Return Loss (Port 1,2)	≥ 23 dB @ f_0 ≥ 20 dB in BW
Isolation (Port 2-1)	≥ 23 dB @ f_0 ≥ 20 dB in ± 15 MHz ≥ 16 dB in full BW
FWD Power Coupling Probe at Port 1	-60 dB \pm 2 dB, non-directional, SMA, female, 50 Ω
REV Power Coupling Probe at Load	-60 dB \pm 2 dB, non-directional, N-Type, female, 50 Ω
RF Waveguide	WR340
RF Flange (input and Output)	CPR340F, flat, 10xM6
Cooling System	Water or water-glycol mixture
Material	stainless steel and copper
Coolant Connectors (Inlet & Outlet)	2x G3/8" female thread
Coolant Inlet Temperature (nominal)	selectable between 20°C and 35°C
Coolant Inlet Temperature Range	$\pm 5^\circ\text{C}$

Coolant Flow Rate	≥ 120 l/h	≥ 120 l/h	≥ 180 l/h
	@ 1 kW	@ 2 kW	@ 3 kW
Coolant Pressure Drop	< 0.5 bar		
Coolant Input Pressure	≤ 6 bar		
Coolant Leak Test Pressure	15 bar for 10min		
Waveguide Dielectric Gas	clean, dry air		
Ambient Temperature			
Operational Temperature	10°C to 45°C, no condensation		
Storage Temperature	0°C to 60°C, no condensation		
Relative Humidity	< 80%, no condensation		
RF Stray Field	< 5 mW/cm ² in 5 cm distance from the surface		
Magnetic Stray Field	< 5 G in 1m distance		
Body Material	Aluminum		
Dimensions L x B x H	see footprint drawing		
Weight (net)	4.5 kg ± 10%		
Mounting Orientation	any		

Ordering Code

I3-WR340-04-2450 - Xp - Xw

Variable	Description	Value Options		
Xp	Forward Power cw [kW]	1	2	3
Xw	Water Temperature [°C]	value between 20 and 35		

Notes:

- Circulator Characteristic Power Capability:** The circulator is designed offer lowest loss and highest peak power capability by using AFT premium microwave ferrites. The device is designed to handle full forward power into a 100% reflective short-circuit at port 2, covering all phase angles, without breakdown. The peak power capability of the device can also be expressed by a “characteristic” power of $P_c = 4x$ forward peak power operated into a matched load at output port 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) Electrical tests: small-signal network analyzer measurements of insertion loss, isolation, and return loss vs. frequency at the nominal water inlet temperature and at an ambient room temperature of $22^{\circ}\text{C} \pm 4^{\circ}\text{C}$, for all ports and signal paths.
 - (2) Water leak test at specified test pressure.
 - (3) Visual inspection.

- 4 Documentation: An owner’s manual is available for providing information on the installation, operation and maintenance of the device. The documentation also includes specification, footprint drawing, an inspection report, and the RF test results as viewgraphs of S-parameters vs. frequency.
The documentation is limited to digital format (no hardcopy) and is available on request.

Rev	Remark	Date	Name
00	initial	11.03.2025	N. Pavlovic