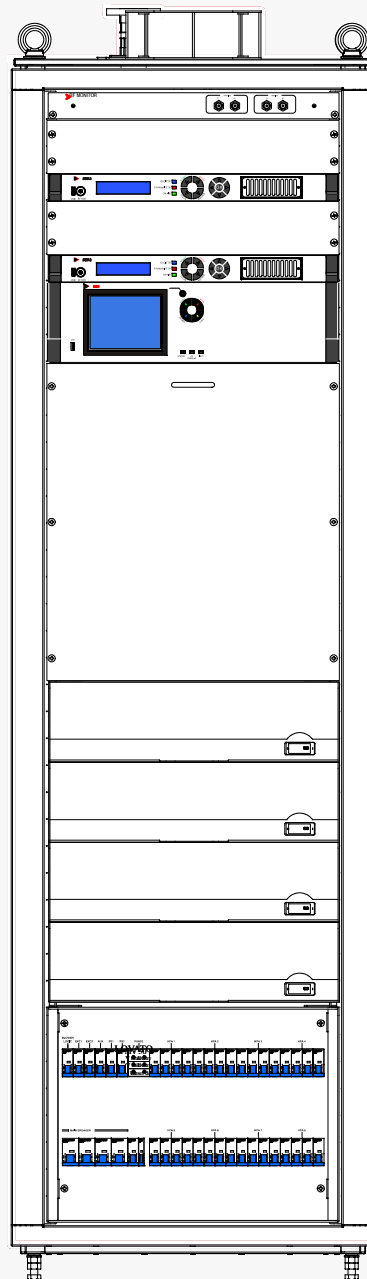


LARANLINE

NEW LIQUID COOLED TX LINE



UHF



liquid cooled

LARAN LINE UHF CONFIGURATIONS

Tab. 1 - Laran line configuration data			
number of HPAs	STANDARD	PWR (KW) (TYPICAL, MER 35dB)	RF OUT CONNECTOR (EIA flanged)
2 HPA	DIGITAL TV standards	2.5	1- 5/8"
	ATSC	2.8	
	ANALOG	8	3- 1/8"
3 HPA	DIGITAL TV standards	3.8	1- 5/8"
	ATSC	4.2	3- 1/8"
	ANALOG	12	
4 HPA	DIGITAL TV standards	5.0	1- 5/8"
	ATSC	5.6	3- 1/8"
	ANALOG	16	
5 HPA	DIGITAL TV standards	6.3	3- 1/8"
	ATSC	7.0	
	ANALOG	19.0	
6 HPA	DIGITAL TV standards	7.5	3- 1/8"
	ATSC	8.4	
	ANALOG	23.0	

LARAN LINE LIQUID COOLED TRANSMITTERS

Dacta Broadcast has updated its range of liquid cooled solid-state transmitters for the UHF broadcast market, with the Laran line.

The new line continues the traditional safety features of Itelco transmitters and improves the ease of operation thanks to the extremely simple design.

The manufacturing process has been optimized to be extremely competitive, meeting the customers' needs in operating costs reduction, ease of maintenance and spare parts management.

Our Laran liquid cooled transmitters, perfectly meet the needs of customers that require medium power, being capable of delivering up to 23 kWps (8 kW DVB) in UHF, all within a single 19" rack.

A unique feature of Laran transmitters is their Multi-Standard Capability encompassing all worldwide standards used for digital television transmission, including the latest technology. The Laran series Multi-Standard platform offers DVB-T2, DVB-T/H, ISDB-T/Tb, ATSC 1/3, and Analog TV standards.

The Laran series supports Dual-Cast and the latest LDMOS technology allows us to provide industry leading liquid cooled transmitters which offer compactness for minimum space requirements inside the station, along with reduced operational costs, for long term energy savings and a very quick return of investment.

Laran transmitters utilize an integrated liquid cooling system, with a *Closed Loop circuit* (with redundant pumps), *heat exchanger* and a *cold plate* inside each amplifier module. The circulators convey the cooling fluid to the heat exchanger where the fluid releases the heat to the external environment, so its

temperature is regulated. The fluid is then routed equally to the module cold plates.

The modules' cold plates keep the power amplifier device cool, greatly increasing their life and reliability.

Each assembly in the transmitter is self-cooled with independent blowers. This gives to our customers the opportunity to easily test every unit outside the transmitter rack, on a station or shop desk.

Advanced transmitter control logic provides complete management of all subassemblies via CAN-bus interface, allowing high speed, extremely detailed control and monitoring. Each unit is additionally equipped with a USB port for a local use.

The equipment control allows the optimization of transmitter operating conditions, even during service of a unit, including power consumption and output power.

The simplicity of the Laran series interface, allows Itelco customers to easily install and maintain the equipment.

To guarantee maximum redundancy, Laran transmitters have been designed to even operate without Control Logic section. Not only is the transmitter able to maintain its operating condition in the last selected state, but it is possible to switch on or off.

The Laran design utilizes redundancy to minimize the likelihood of any failure resulting in an off-air condition, even the unit is under service. Itelco's well known attention to safety has not been neglected, with the customer protected by the careful design of the transmitter architecture.

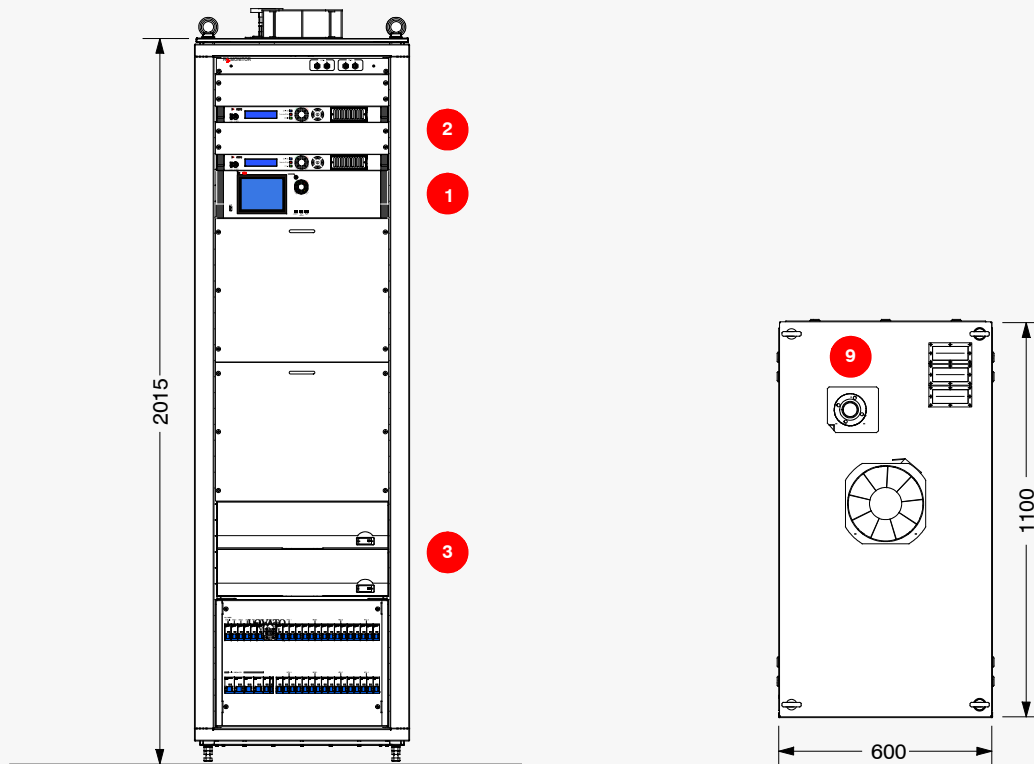
MAIN FEATURES

- **Multi-Standard operation**
(DVB-T/H/T2, ATSC, ATSC 3.0, ISDB-T/Tb, Analog - all standards)
- **Dual-Cast operation** (optional)
- **Fully broadband** on UHF frequencies
- **Doherty technology** (AB class optional)
- **Latest LDMOS** technology for HPA
- **Hot-pluggable** HPA
- **USB port** for HPA section
- **MEX-II** multi-standard exciter
- **Seamless inputs** between ASI and/or IP (with priority) all combinations in SFN
- **Adaptive precorrection**
- **2 ASI**
- **2 GbE** available inputs
- **Extremely** compact design
- **Modular** design
- **Easy installation** and maintenance
- **Band-pass filter** option (outside Tx cabinet)
- **SNMP / Web Server** remote control
- **CAN-bus** internal communication
- **Internal GPS** for SFN operation (optional)
- **Remote** software/firmware upgrade
- **High Efficiency** liquid cooling system

SPECIFICATIONS

RF DATA		
Frequency range	470 to 690 Mhz 750 to 810 Mhz	
■ UHF band IV - V	Doherty mode Doherty mode (option)	
RF Output power	refer to 9Tab. 1	
RF Output connector	refer to Tab. 1 Impedance 50 Ω	
RF Output	VSWR 1.4:1	
Shoulder	> 38 dB	
MER	> 35 dB	
Crest factor	8.5 to 9.5 dB	
Spurious Emissions	< - 70 dBc with filter	
Harmonic Emissions	< - 70 dBc with filter (Before Filter < /= - 40 dBc)	
In band Spurious Emissions	< - 70 dBc	
STANDARDS		
■ Digital TV		
Standards	DVB- T (fully compliant with EN 300 744, TS 101 191) DVB- T2 (EN 302 755 (DVB- T2 Version 1.3.1) able to Broadcast in Version 1.2.1 and 1.3.1, TS 102 773; TR101 290; TS 102 2831) ISDB- T/T _b (ARIB STB- B31, TR- B14) ATSC, ATSC Mobile DTV, ATSC 3.0	
Channel Bnadwidth	5/6/7/8 MHz 1.7/5/6/7/8 MHz 6/8 MHz 6 MHz, 7 MHz, 8 MHz	
DVB- T2	QPSK, 16QAM, 64QAM, 256QAM, 1/128, 1/32, 1/16, 19/256, 1/8, 19/128, 1/4 1k, 2k, 4k, 8k, 16k, 32k (Normal or Extended) 1/2, 3/5, 2/3, 3/4, 4/5, 5/6 MFN / SFN	
Inputs	2 BNC 75 Ω, / 2 RJ45 - MPEG- 2 TS- IP or ASI / T2- MI, S/M PLPs TS 188/204 packets, continuous and burst mode, 2 RJ45 GbE 2 SMPTE310M or 2 ASI, 75 Ω BNC, 2 RJ45	
■ DVB- T/T2, ISDB- T/T _b , DTMB		
■ ATSC, ATSC 3.0		
■ Analog TV (option upon request)		
Standards (compliance to CCIR report 642- 2 volume XI part I, ETS 300 384)	B/G/D/K/K1/M/N/I/I1/L	
Color transmission	PAL, NTSC, SECAM	
Sound transmission	IRT dual- sound config, FM single sound and NICAM728 (- 13 dB/- 20 dB) optional, FM single sound (- 10 dB)	
Inputs	2 BNC 75 Ω, 1 V _{pp} ± 6 dB. Manual Gain or AGC on ITS line, DC Restore, White Limiter (85- 95%), Sync Restore (20- 30%)	
■ Video		
■ Audio	2 XLR 600 Ω/5 kΩ balan/unbal, 0 dBm - 3 dB +19 dB. In wideband mode input 2 works up to 120kHz (MPX)	
■ Additional Audio	1 BNC 50 Ω/5 kΩ for MPX (up to 120 kHz) and 1 BNC 50 Ω for auxiliary services for standard M	
■ NICAM audio	2 XLR 600 Ω/5 kΩ balan/unbal, 0 dBm ± 10 dB	
■ NICAM data input	1 BNC TTL 728 Kbit/s ext. data, 1 BNC TTL 728 kHz ext. clock	
MAINS SUPPLY VOLTAGE		
Ac supply	single phase 208V _{ac} - 230V _{ac} three phase + N + PE 3 x 208V _{ac} 3 x 230V _{ac} 3 x 400V _{ac}	
Frequency	50/60 Hz ± 4%	
Power factor	> 0.95	
Efficiency (COFDM) with heat exchangers	up to	up to 37% Doherty / 22% AB class (option)
Efficiency (COFDM) without heat exchangers	up to	up to 38% Doherty / 24% AB class (option)
THD	< 6%	
Safety	EN 60215/EN 60950	
EMC	EN 301489	
REMOTE INTERFACES		
Local control	Display(s), Keyboard(s), and USB ports	
Remote control	Ethernet for HTTP (Web Server)/SNMP/NTP/SSL, RS232, Parallel (Telnet)	

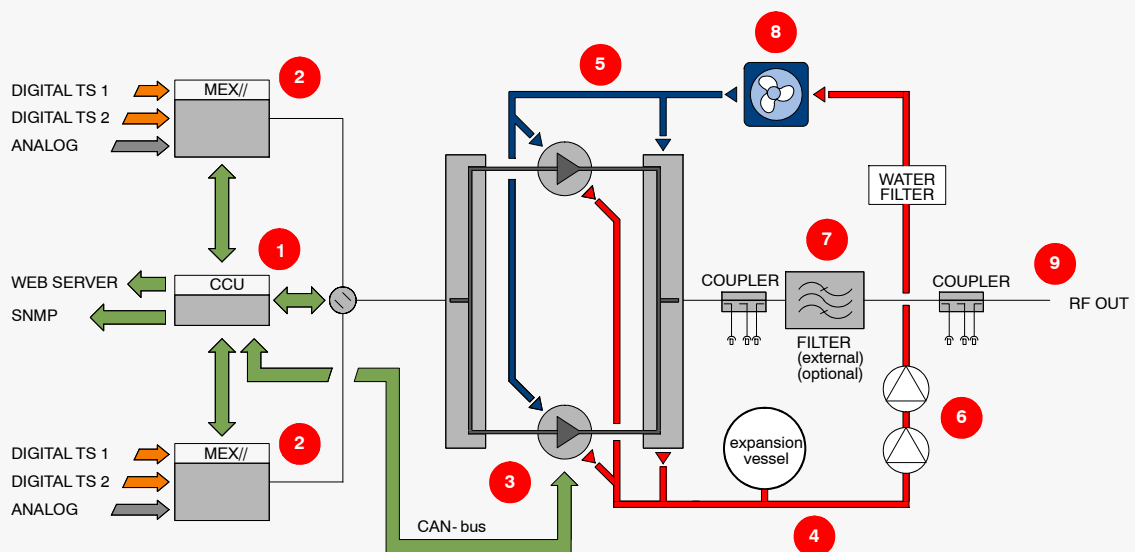
Test points	RF out monitor, RF amp output, RF exciter output
SYNCHRONIZATION	
Reference frequency	Internal (OCXO or integrated GPS)/Internal locked to the External (BNC 50 Ω , 10 MHz)
Reference pulse	1pps Internal (integrated GPS)/External (BNC 50 Ω , TTL)
Internal reference Accuracy	$\pm 1 \cdot 10^{-8}$ (0 to 70 °C) $\pm 5 \cdot 10^{-10}$ per day (after 30 day) $\pm 1 \cdot 10^{-7}$ per year
METERING	
■ Digital TV	
	- forward output power - reflected power - Exciter, HPA and PSUs" can be available locally or remotely
■ Analog TV	
	- vision carrier output power - sound carrier output power - forward output power - reflected power
COOLING	
HPAs and output combiner dummy load	liquid
Transmitter cabinet	forced air
MECHANICAL	
RACK	19" - 42 HU/ steel
DIMENSIONS (W x H x D, in mm)	600 x 2015 x 1100
WEIGHTS (kg) (Transmitter Cabinet +dual exciter + 4 HPA)	400
COLOUR	
Cabinets	black
Units	light grey
ENVIRONMENTAL	
Ambient temperature range	0 °C to +55 °C
Storage temperature range	- 30 °C to +70 °C
Relative humidity (@ 40 °C)	95% without condensation
Max. Operating altitude (asl)	Up to 3000 meters
Safety rules	EN 60215 / EN 60950
EMC	EN 301489

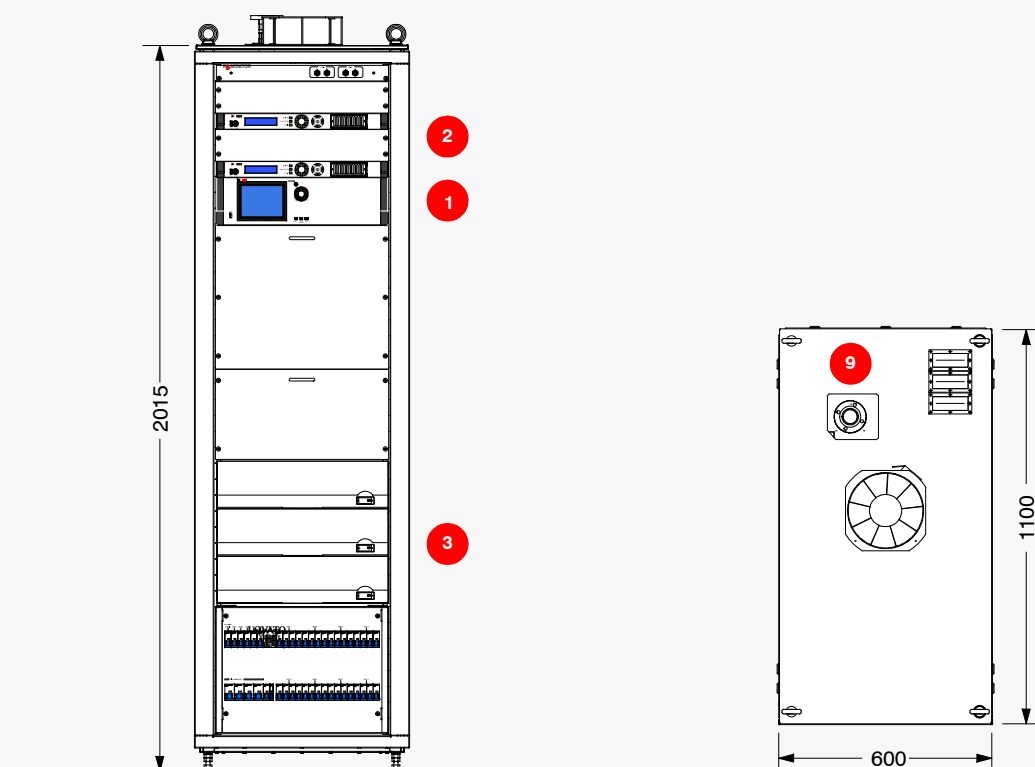


LARAN 2 HPA

1	CCU TX CONTROL UNIT	6	CIRCULATORS
2	MEX// MULTISTANDARD MODULATOR ⁽¹⁾	7	BAND PASS FILTER (external, optional)
3	HPA SECTION	8	HEAT EXCHANGER
4	COOLING CIRCUIT (hot water)	9	RF OUT TO ANTENNA/COMBINER
5	COOLING CIRCUIT (cold water)		

⁽¹⁾ DUAL-DRIVE CONFIGURATION IS OPTIONAL

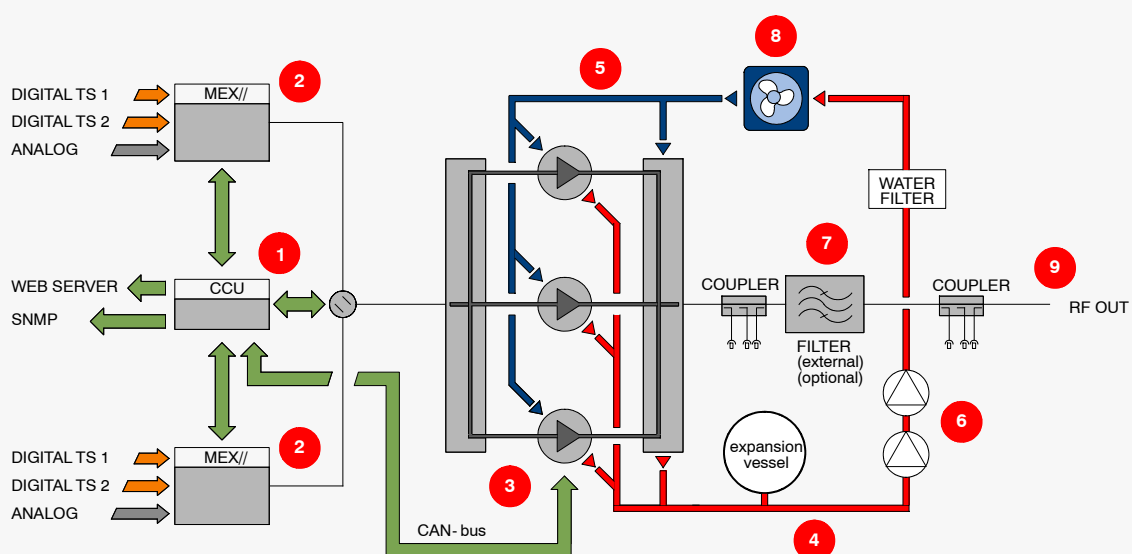


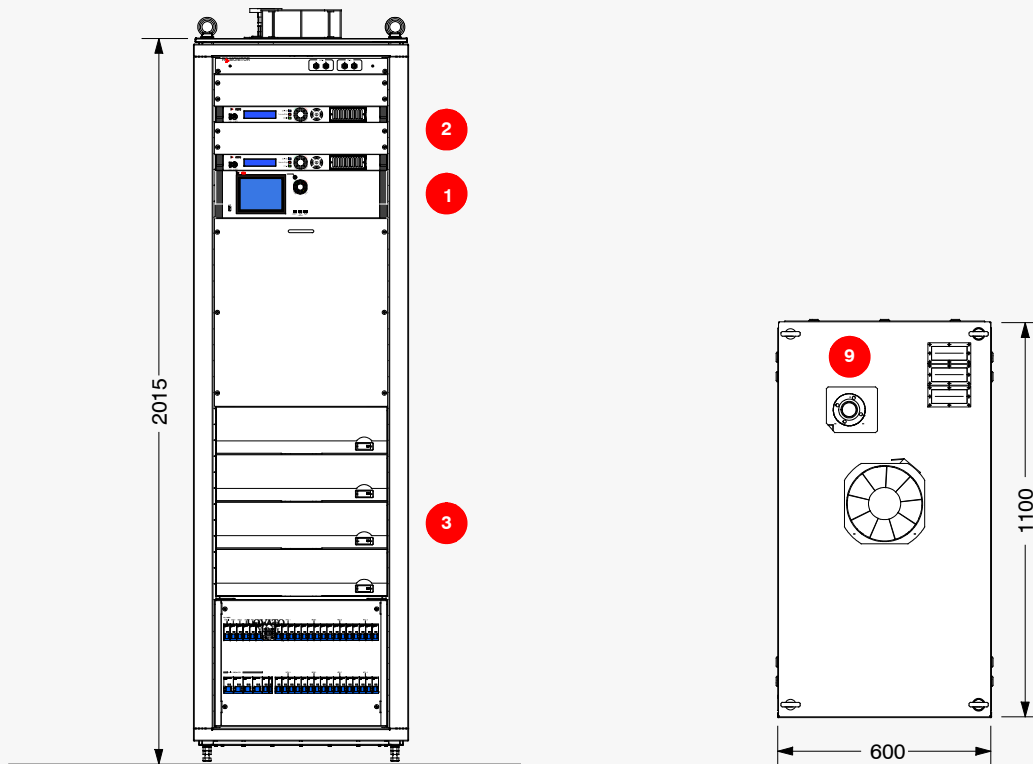


LARAN 3 HPA

1	CCU TX CONTROL UNIT	6	CIRCULATORS
2	MEX// MULTISTANDARD MODULATOR ⁽¹⁾	7	BAND PASS FILTER (external, optional)
3	HPA SECTION	8	HEAT EXCHANGER
4	COOLING CIRCUIT (hot water)	9	RF OUT TO ANTENNA/COMBINER
5	COOLING CIRCUIT (cold water)		

⁽¹⁾ DUAL-DRIVE CONFIGURATION IS OPTIONAL

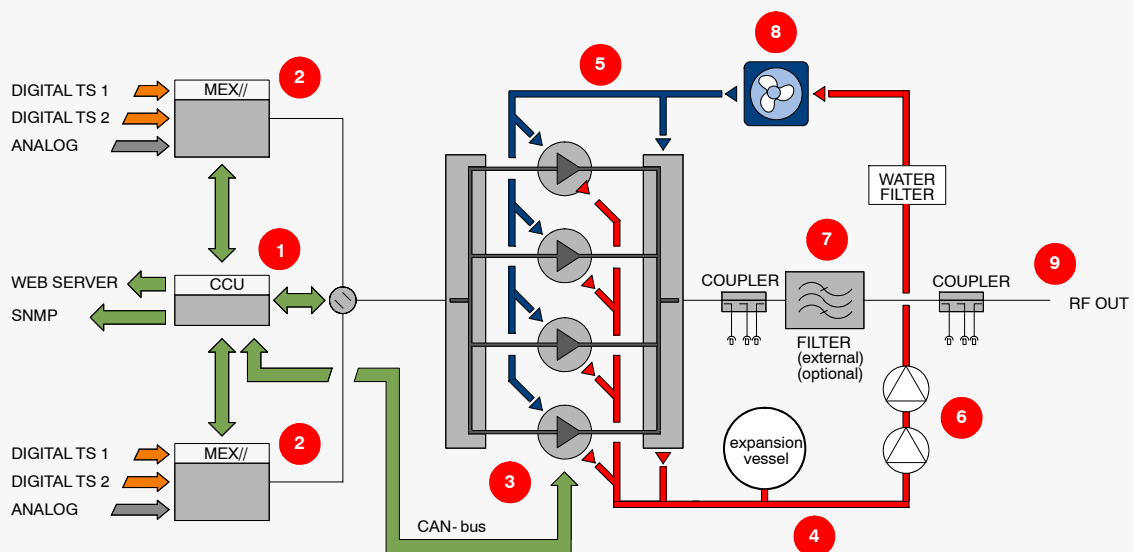


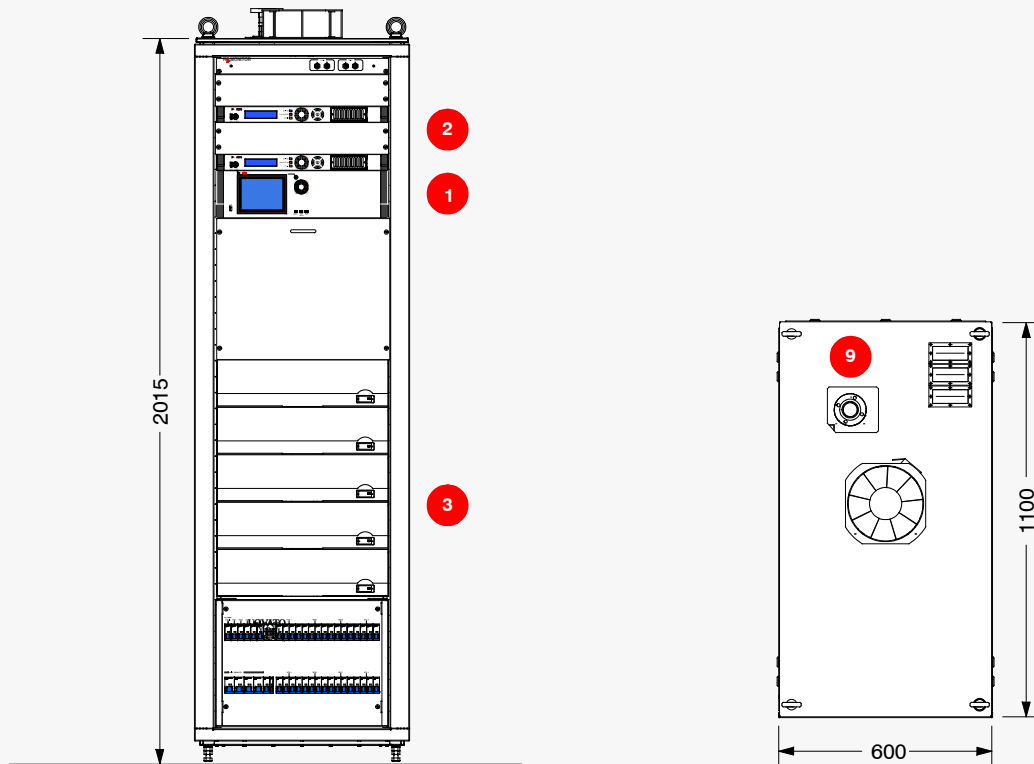


LARAN 4 HPA

1	CCU TX CONTROL UNIT	6	CIRCULATORS
2	MEX// MULTISTANDARD MODULATOR ⁽¹⁾	7	BAND PASS FILTER (external, optional)
3	HPA SECTION	8	HEAT EXCHANGER
4	COOLING CIRCUIT (hot water)	9	RF OUT TO ANTENNA/COMBINER
5	COOLING CIRCUIT (cold water)		

⁽¹⁾ DUAL-DRIVE CONFIGURATION IS OPTIONAL

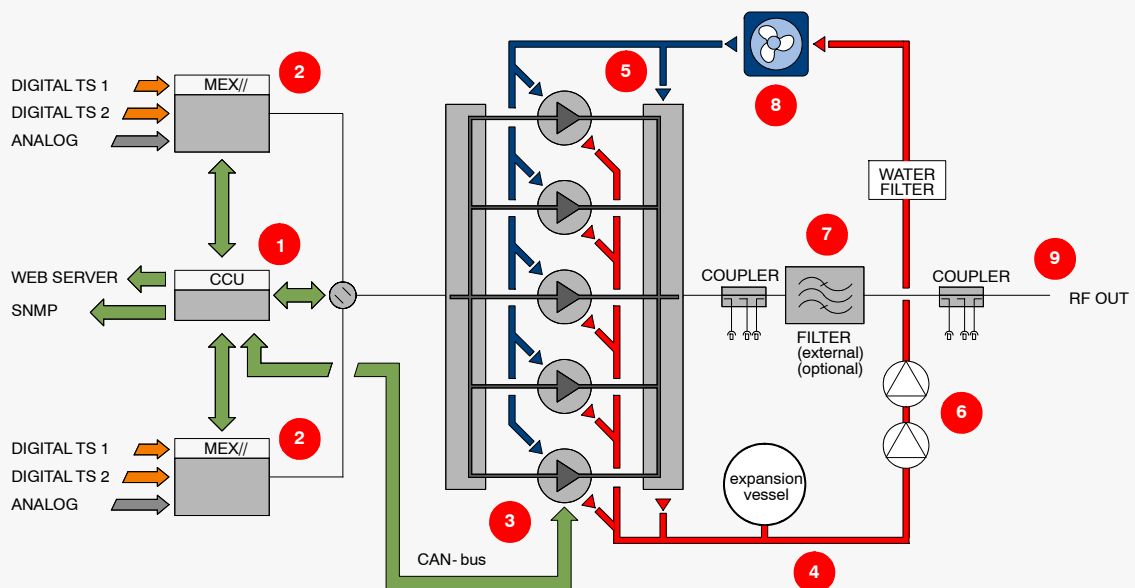


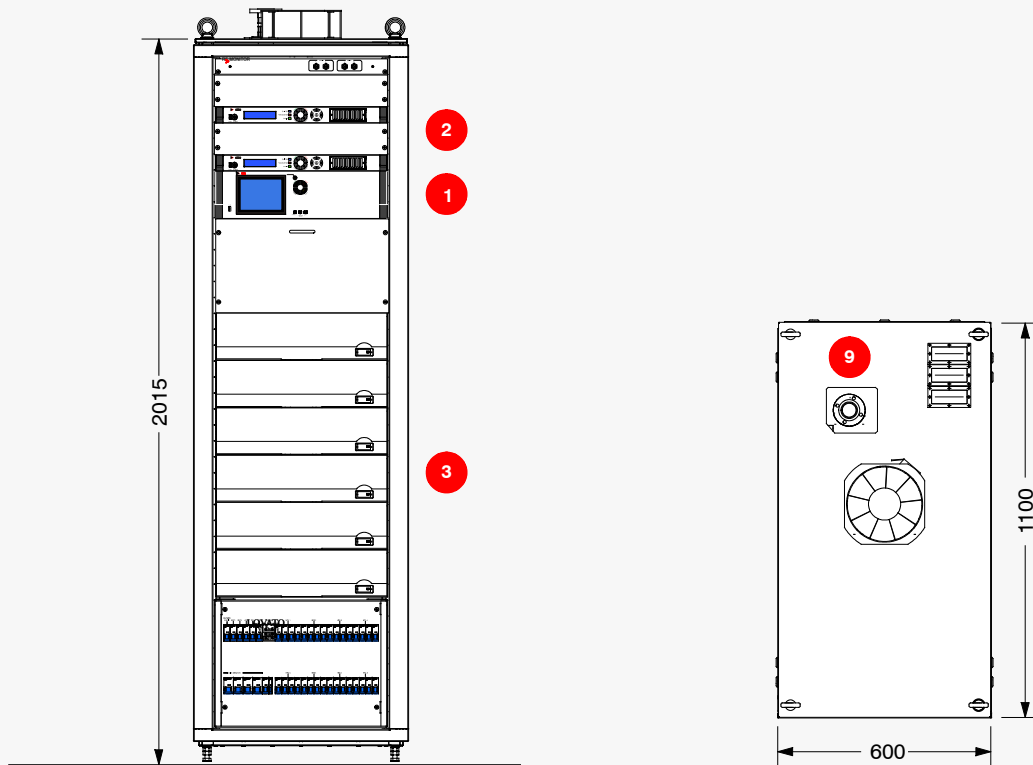


LARAN 5 HPA

1	CCU TX CONTROL UNIT	6	CIRCULATORS
2	MEX// MULTISTANDARD MODULATOR ⁽¹⁾	7	BAND PASS FILTER (external, optional)
3	HPA SECTION	8	HEAT EXCHANGER
4	COOLING CIRCUIT (hot water)	9	RF OUT TO ANTENNA/COMBINER
5	COOLING CIRCUIT (cold water)		

⁽¹⁾ DUAL-DRIVE CONFIGURATION IS OPTIONAL

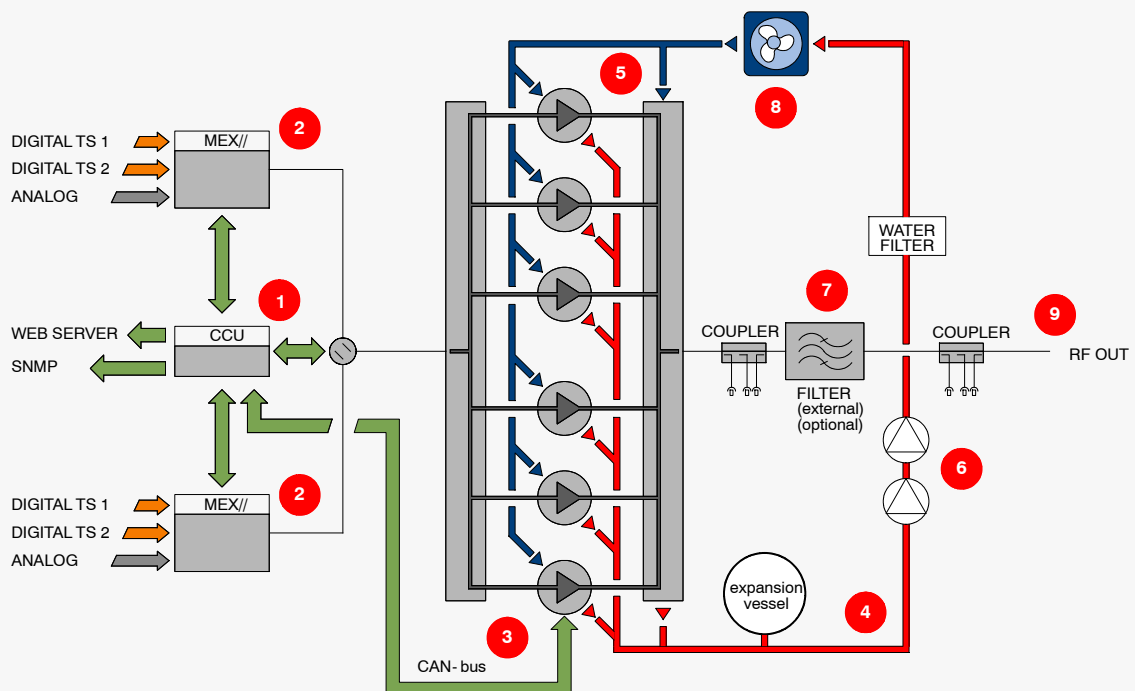




LARAN 6 HPA

1	CCU TX CONTROL UNIT	6	CIRCULATORS
2	MEX// MULTISTANDARD MODULATOR ⁽¹⁾	7	BAND PASS FILTER (external, optional)
3	HPA SECTION	8	HEAT EXCHANGER
4	COOLING CIRCUIT (hot water)	9	RF OUT TO ANTENNA/COMBINER
5	COOLING CIRCUIT (cold water)		

⁽¹⁾ DUAL-DRIVE CONFIGURATION IS OPTIONAL



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