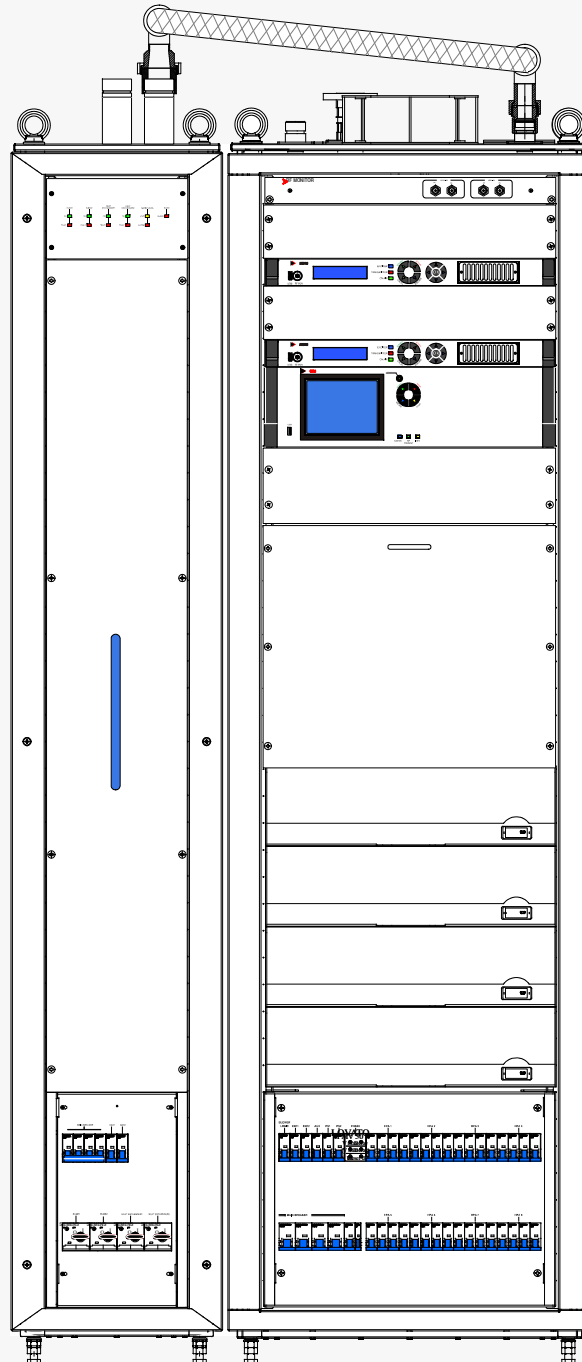


NORTHLINE

NEW LIQUID COOLED TX LINE



NORTHIA LINE CONFIGURATIONS

Tab. 1 - Northia line configuration data

Tab. 1 - Northia line configuration data						
HPAs number		PWR (KW)			RF OUT CONNECTOR (EIA flanged)	
		MIN	TYP	MAX	VHF	UHF
2 HPA	DIGITAL TV standards	2.5 (MER 33dB) 2.4 (MER 36dB)	2.6 (MER 33dB) 2.5 (MER 36dB)	2.6 (MER 33dB) 2.5 (MER 36dB)	1-5/8"	
	ATSC 1.0	2.8				
	DAB	4				
	ANALOG	7				
3 HPA	DIGITAL TV standards	3.7 (MER 33dB) 3.6 (MER 36dB)	3.9 (MER 33dB) 3.7 (MER 36dB)	3.9 (MER 33dB) 3.7 (MER 36dB)	1-5/8"	
	ATSC 1.0	4.2				
	DAB	6				
	ANALOG	10			1-5/8"	3-1/8"
4 HPA	DIGITAL TV standards	5.0 (MER 33dB) 4.9 (MER 36dB)	5.2 (MER 33dB) 5.0 (MER 36dB)	5.2 (MER 33dB) 5.0 (MER 36dB)	1-5/8"	
	ATSC 1.0	5.7				
	DAB	8				
	ANALOG	12			1-5/8"	3-1/8"
5 HPA	DIGITAL TV standards	6.2 (MER 33dB) 6.0 (MER 36dB)	6.4 (MER 33dB) 6.2 (MER 36dB)	6.4 (MER 33dB) 6.2 (MER 36dB)	3-1/8"	
	ATSC 1.0	7.0				
	DAB	10.0				
	ANALOG	15.0				
6 HPA	DIGITAL TV standards	7.0 (MER 33dB) 7.3 (MER 36dB)	7.6 (MER 33dB) 7.5 (MER 36dB)	7.6 (MER 33dB) 6.5 (MER 36dB)	3-1/8"	
	ATSC 1.0	8.3				
	DAB	12.0				
	ANALOG	18				
8 HPA	DIGITAL TV standards	9.6 (MER 33dB) 9.6 (MER 36dB)	10.2 (MER 33dB) 10.0 (MER 36dB)	10.2 (MER 33dB) 10.0 (MER 36dB)	3-1/8"	
	ATSC 1.0	11.0				
	DAB	15.0				
	ANALOG	22				

NORTHIA LINE LIQUID COOLED TRANSMITTERS

Itelco has updated its Northia range of liquid cooled solid-state transmitters for UHF television broadcast.

The new line maintains the traditional safety features of Itelco transmitters and improves the ease of operation and service.

Itelco has also made improvements in its manufacturing process which result in improved performance and reliability while further improving the cost effectiveness of the line.

The Northia series of liquid cooled transmitters, perfectly meet the needs of customers that require medium power solutions, providing up to 20kWps (10kW DTV), all in a single 19" rack. Custom configurations can be housed in multiple cabinets.

Uniquely, all Northia transmitters offer Multi-Standard Capability which makes them compatible with all worldwide standards used for digital and analog transmission, even the most current including DVB-T2, DVB-T/H, ISDB-T/Tb, ATSC, ATSC 3.0, as well as PAL, Secam and NTSC.

All transmitters of Northia lines can be programmed to switch from one standard to another (Dual-Cast), and the use of latest LDMOS technology provides the new lines of liquid cooled transmitters new levels of compactness, reduced operational costs, via substantial power consumption reduction.

Northia transmitters are liquid cooled, with two independent water pumps in passive reserve, and a cold plate inside to each amplifier module. The active pump conveys the cooling fluid to the external heat exchangers where the heat is released, keeping the transmitter and the transmitter room cool and clean.

The cooling liquid is routed equally to the module cold plates, which assure that the power devices are kept cool, increasing their reliability, efficiency and length of life.

Each transmitter subassembly is self-cooled using independent blowers. This allows the end user to easily test every unit outside the transmitter rack, on the workbench.

The transmitter control logic communicates with each assembly through a CAN-bus connection, allowing high speed, detailed and robust data exchange. Each module is also equipped with a USB port for local troubleshooting.

The control logic also allows transmitter optimization, even during operation, including for both maximum efficiency and power output.

The installation and support of the Northia series transmitters couldn't be easier with simple, clean and well labeled connections.

Carefully designed redundancy means it's nearly impossible for a failure to take the transmitter off air. The transmitters can even be operated without the controller, as the system maintains the last operating condition and can still be switched on and off.

The design engineers at Itelco have utilized their decades of experience to maximize reliability and robustness. Safety is also a primary design philosophy, assuring personnel safe conditions in installation, operation and service. During maintenance of one of the transmitter assemblies, all power is removed from that assembly automatically.

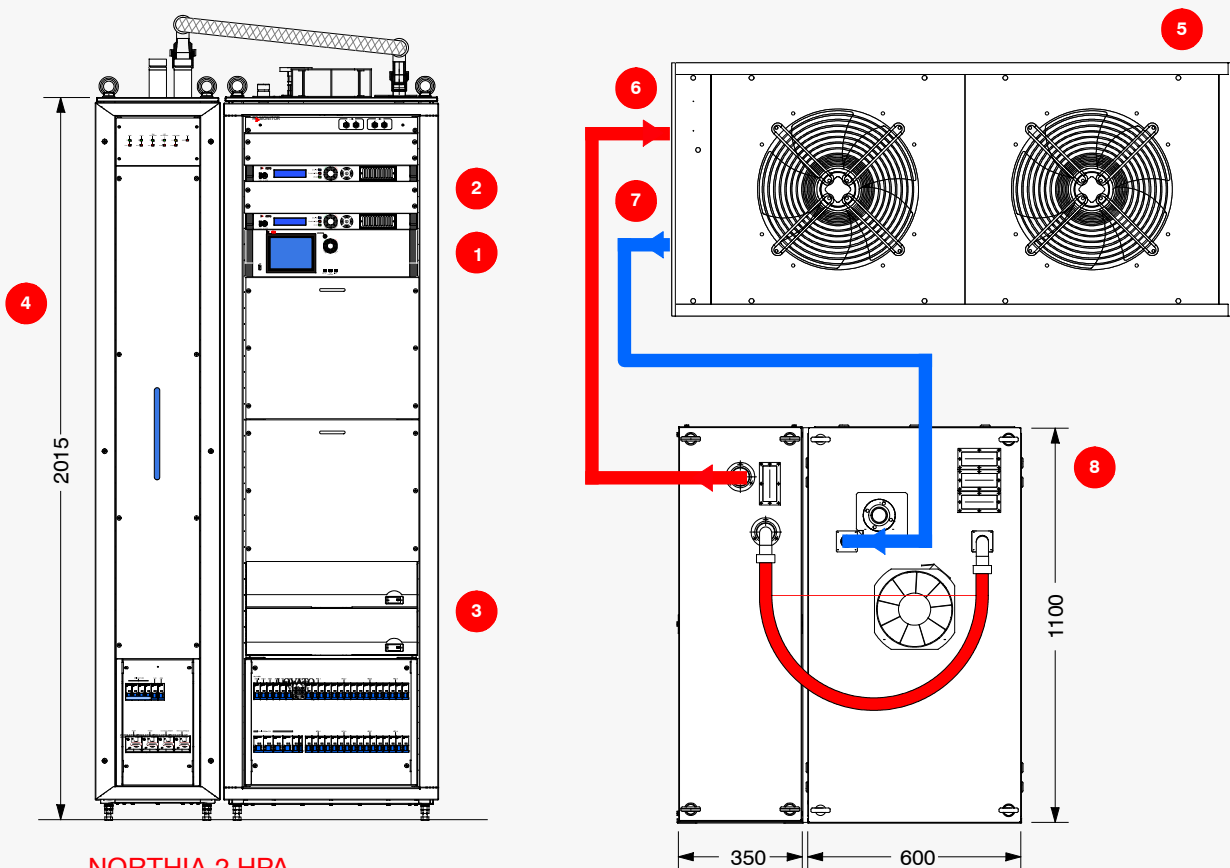
MAIN FEATURES

- **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
- **Low power consumption**
- **Doherty technology**
- **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
- **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 (690) MHz <i>Doherty mode</i> 470 to 860 (870) MHz <i>class AB (available only on request)</i>	
RF Output power	refer to Tab. 1	
RF Output connector	refer to Tab. 1 Impedance 50 Ω	
Shoulder	> 38 dB	
MER	> 35 dB (DAB > 30 dB)	
Crest factor	8.5 to 9.5 dB	
Spurious Emissions	< - 70 dBc with filter	
Harmonic Emissions	< - 70 dBc with filter	
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, TS 102 773; TR101 290; TS 102 2831) ISDB- T/T _b (ARIB STB-B31, TR-B14) ATSC, ATSC Mobile DTV, ATSC 3.0 DTMB	
Channel Bnadwidth	5/6/7/8 MHz 1.7/5/6/7/8 MHz 6/8 MHz 6 MHz, 7 MHz, 8 MHz 6/8 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	
■ Digital Radio/Mobil tv in VHF band		
Standards	DAB, DAB+, T- DMB	
Channel Bnadwidth	1.536 MHz	
Inputs	2 BNC 75 Ω, (NI, G703), (NA, G7049 5376, (NA,G704) 5592 and jitter tolerance according to G.823 2 RJ45, IP, RTP, UDP, IGMP (v2 & v3)	
■ Analog TV (Optionn)		
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) <i>optional</i> , 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%) 2 XLR 600 Ω/5 kΩ balan/unbal, 0 dBm - 3 dB +19 dB. In wideband mode input 2 works up to 120kHz (MPX) 1 BNC 50 Ω/5 kΩ for MPX (up to 120 kHz) and 1 BNC 50 Ω for auxiliary services for standard M 2 XLR 600 Ω/5 kΩ balan/unbal, 0 dBm ± 10 dB 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	VHF: up to 24% class AB / 32% Doherty UHF: up to 30% Doherty / 22% AB class	

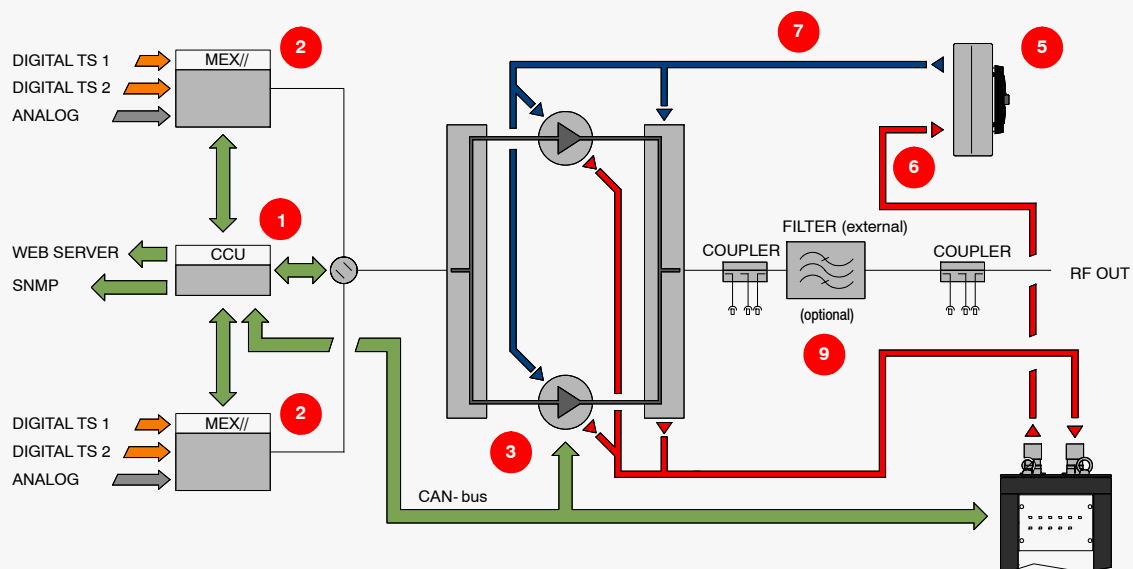
Efficiency (COFDM) <i>without heat exchangers</i>	UHF: up to 32%Doherty / 24% AB class
THD	< 6%
Safety	EN 60215/EN 60950
EMC	EN 301489
REMOTE INTERFACES	
Local control	Display(s), Keyboard(s), and USB ports
Remote control	Ethernet for HTTP (Web Server)/SNMP/NTP/SSL, RS232, Parallel
Test points	RF out 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
■ 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	
Transmitter Cabinet(s)	42 HE/ steel
Water Cooling Unit Cabinet	42 HE/ steel
DIMENSIONS (W x H x D, in mm)	
Transmitter Cabinet(s)	600 x 2015 x 1100
Water Cooling Unit Cabinet	350 x 2015 x 1100
WEIGHTS (kg)	
Transmitter Cabinet(s)	400 (dual exciter + 4 HPA)
Water Cooling Unit Cabinet	150
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

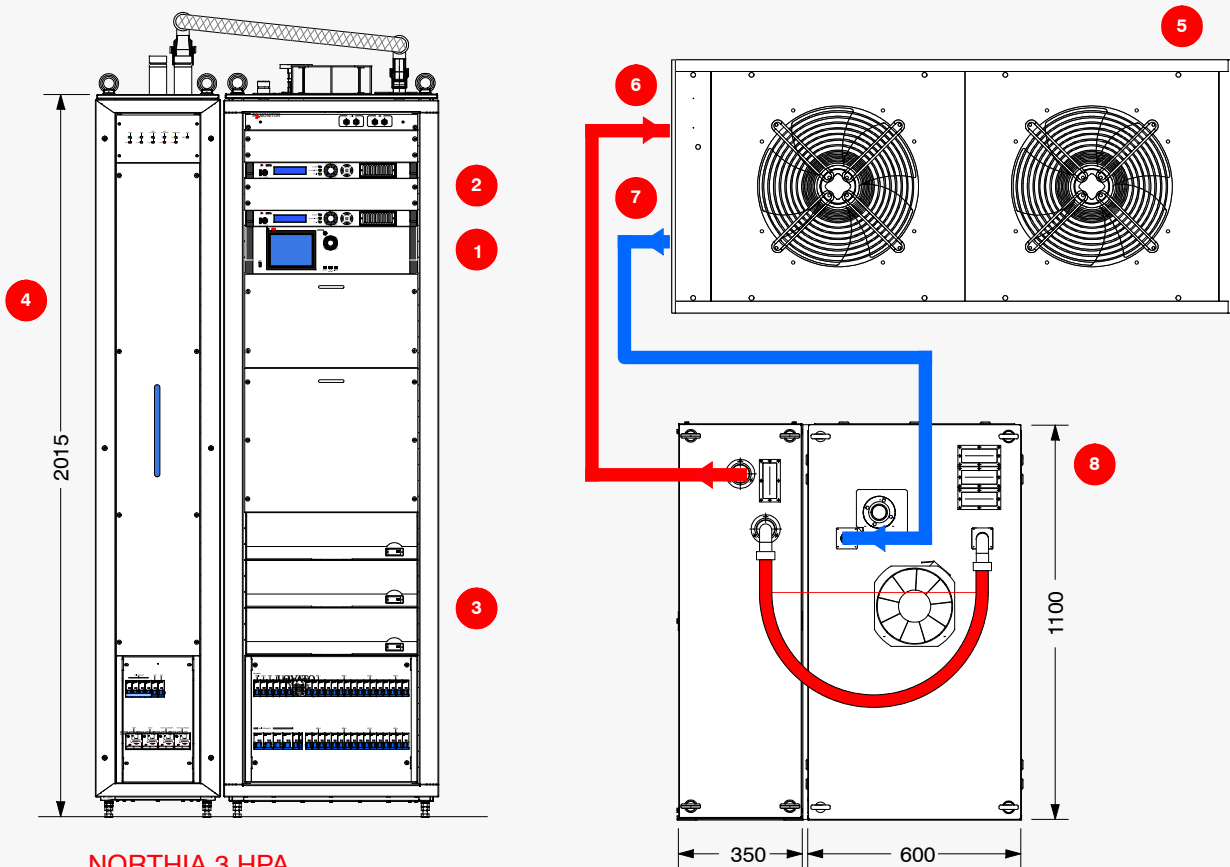


NORTHIA 2 HPA

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

⁽¹⁾ DUAL-DRIVE CONFIGURATION IS OPTIONAL

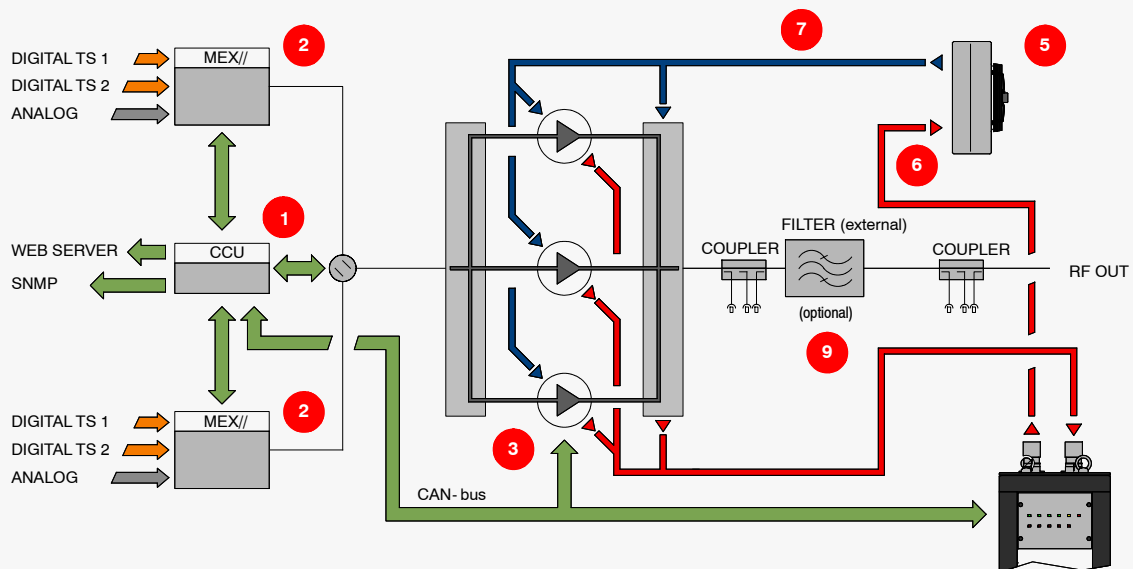


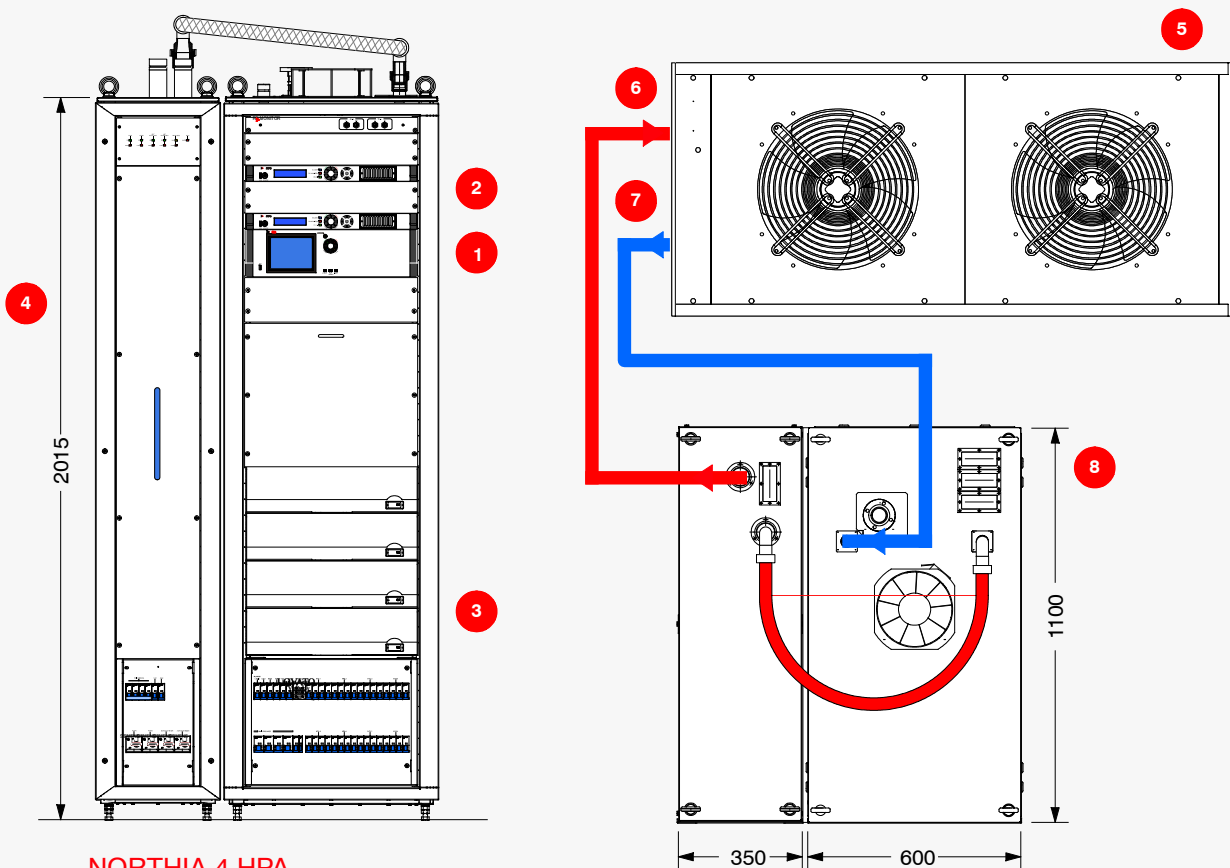


NORTHIA 3 HPA

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

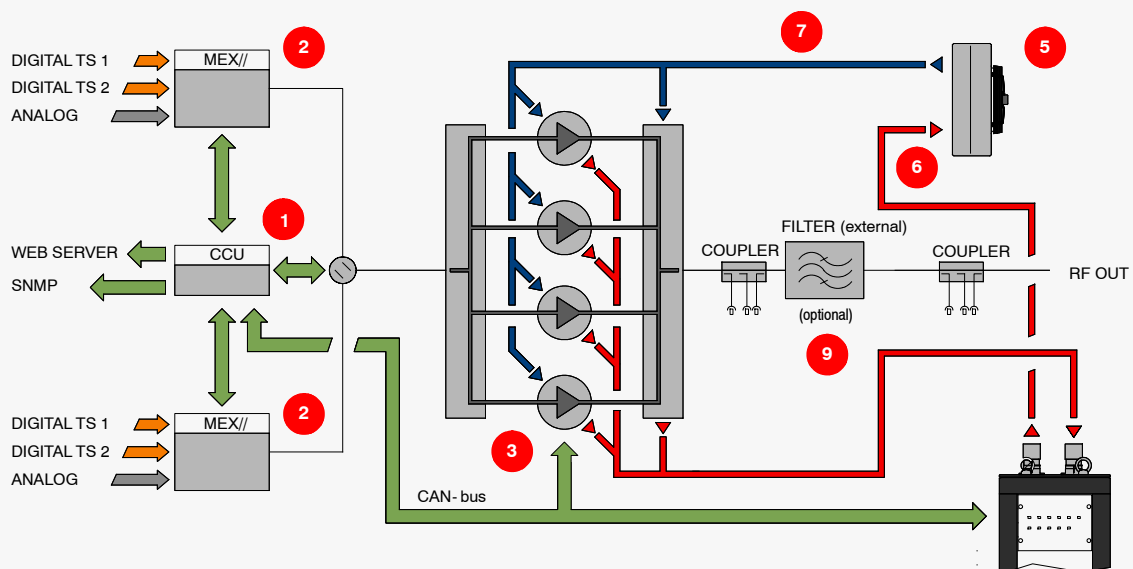
⁽¹⁾ DUAL-DRIVE CONFIGURATION IS OPTIONAL

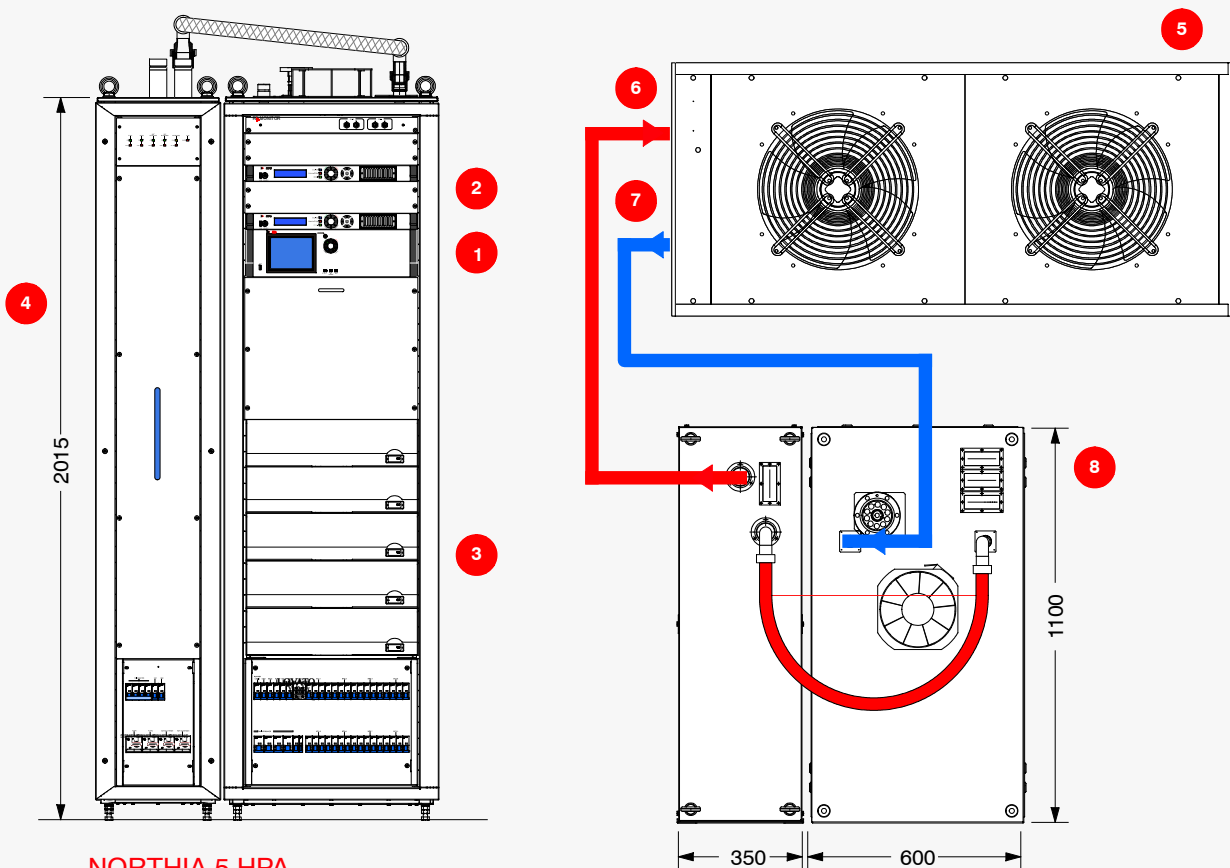




1	CCU TX CONTROL UNIT	6	COOLING CIRCUIT (hot water)
2	MEX// MULTISTANDARD MODULATOR ⁽¹⁾	7	COOLING CIRCUIT (cold water)
3	HPA SECTION	8	RF OUT TO ANTENNA/COMBINER
4	COOLING UNIT (dual pumps)	9	BAND PASS FILTER (external, optional)
5	HEAT EXCHANGERS		

⁽¹⁾ DUAL-DRIVE CONFIGURATION IS OPTIONAL

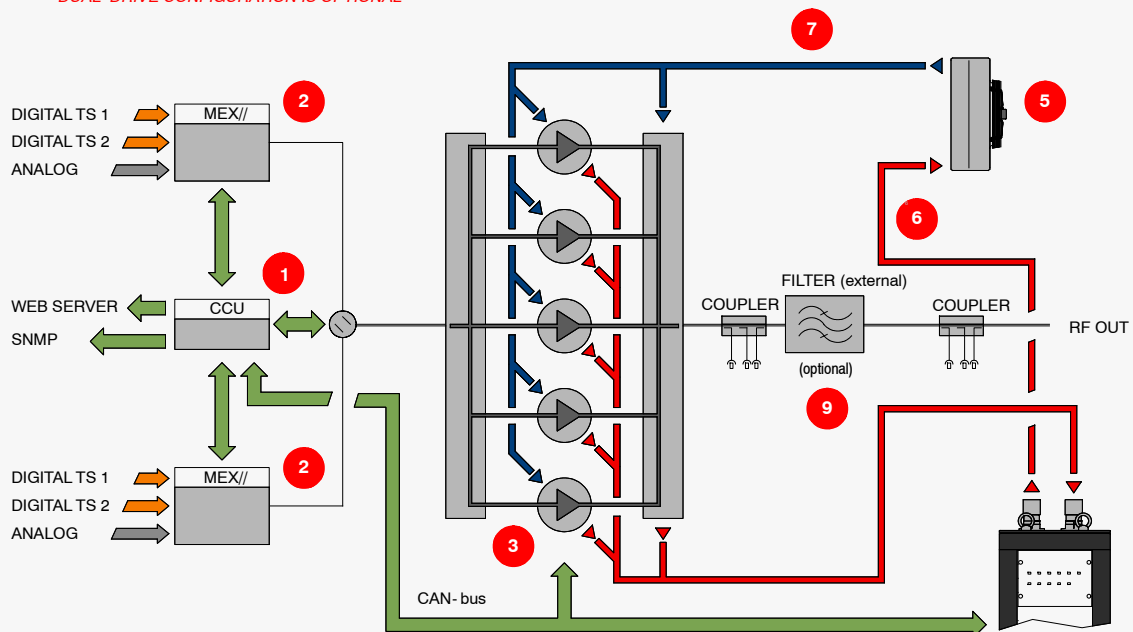


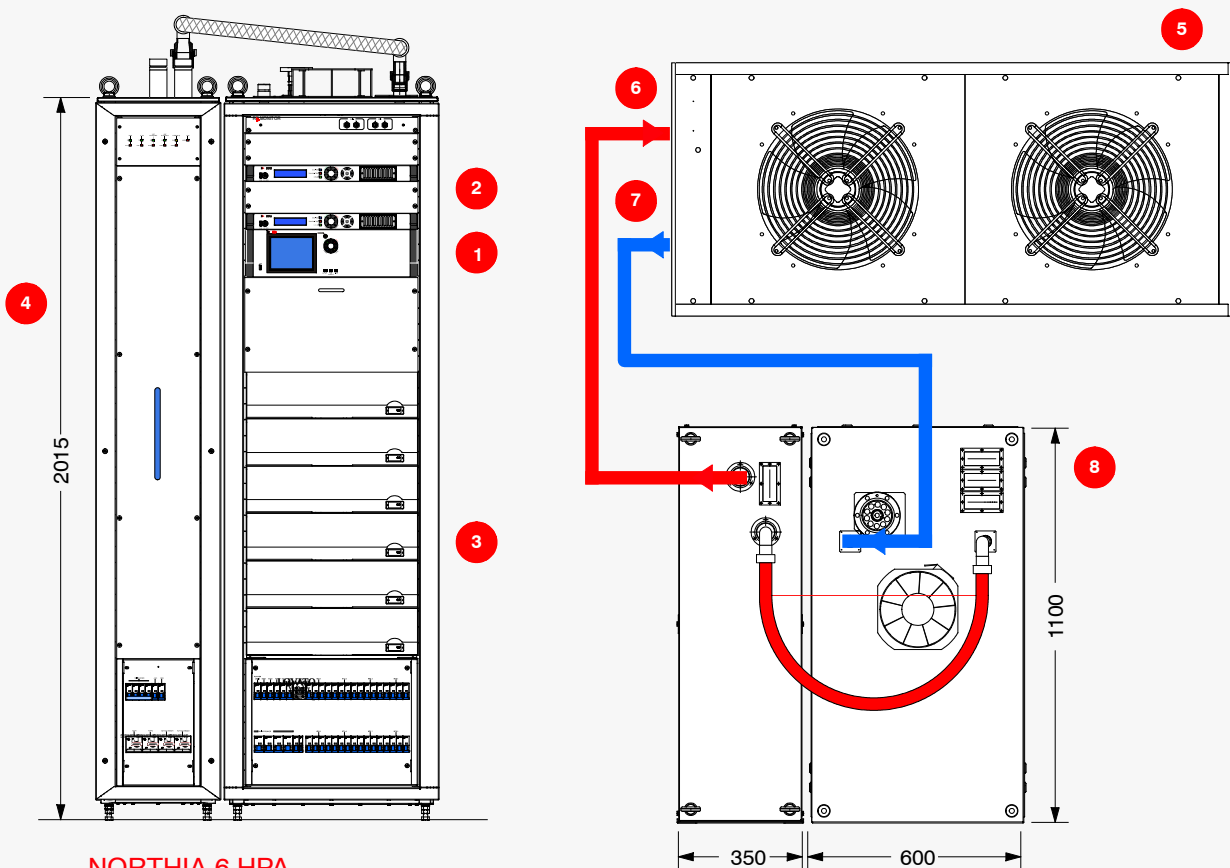


NORTHIA 5 HPA

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

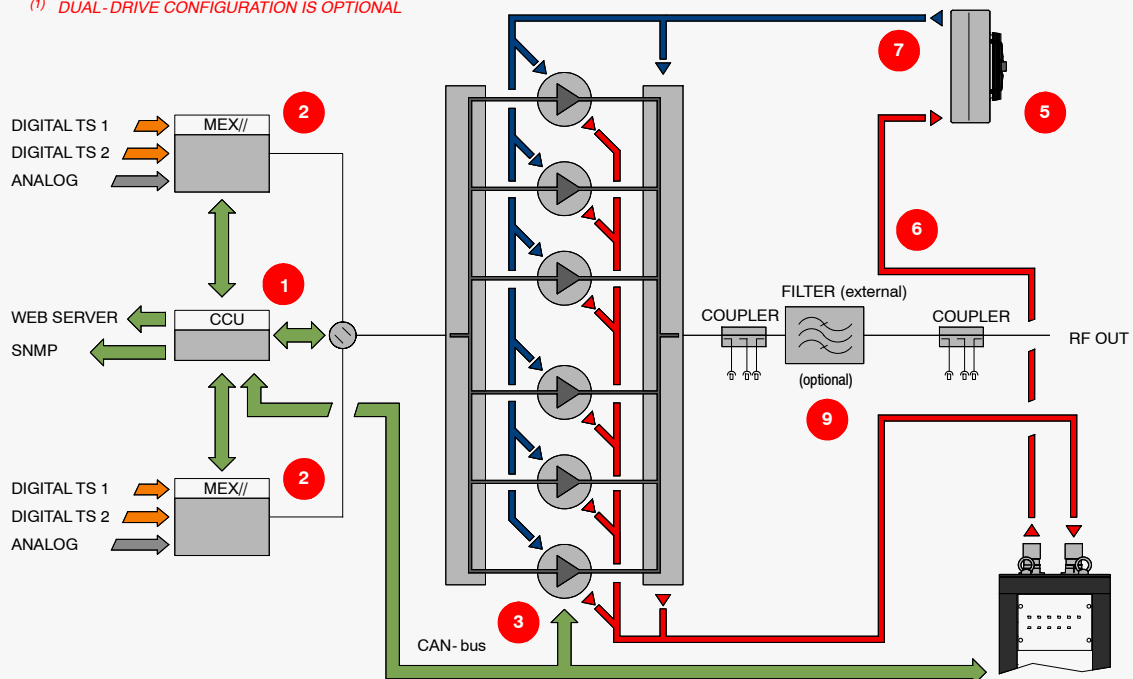
⁽¹⁾ DUAL-DRIVE CONFIGURATION IS OPTIONAL

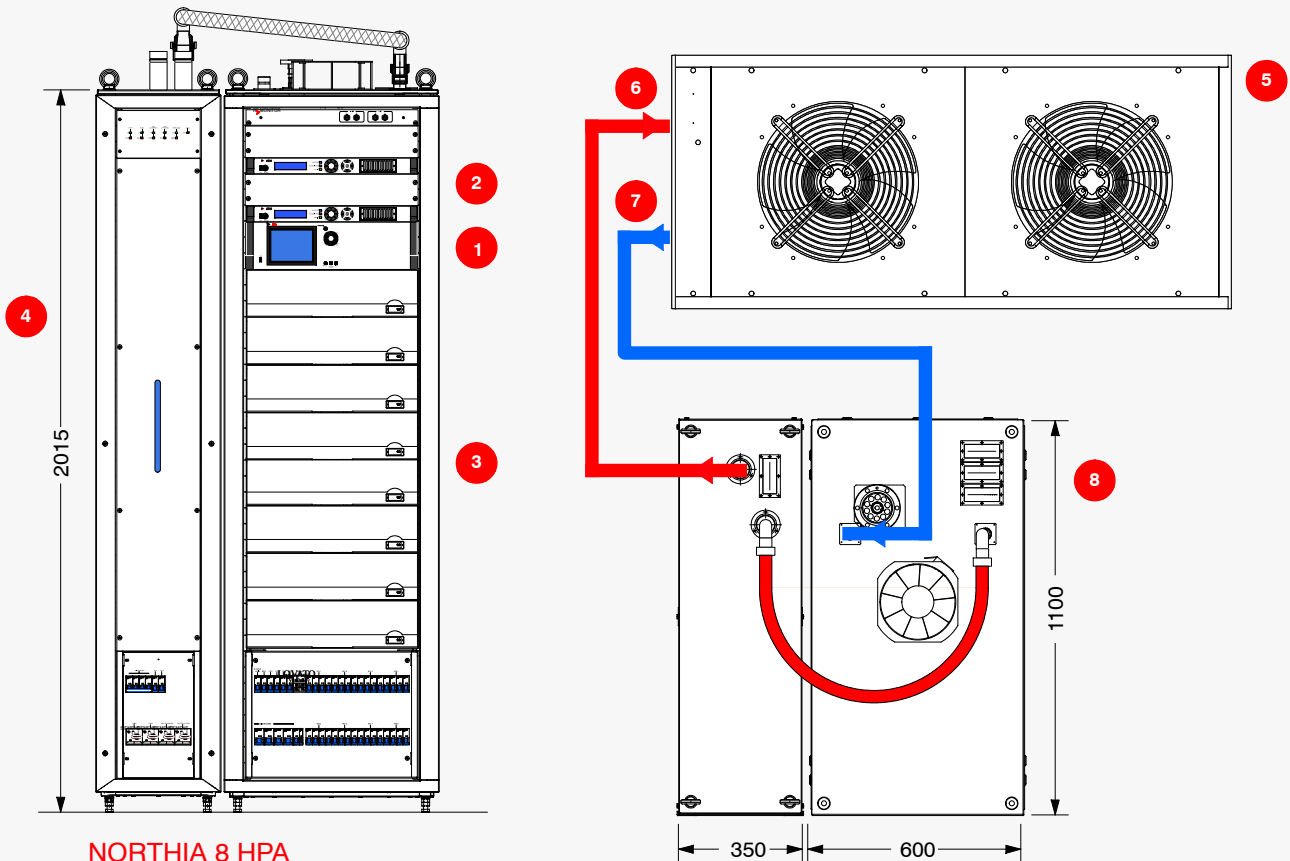




1	CCU TX CONTROL UNIT	6	COOLING CIRCUIT (hot water)
2	MEX// MULTISTANDARD MODULATOR ⁽¹⁾	7	COOLING CIRCUIT (cold water)
3	HPA SECTION	8	RF OUT TO ANTENNA/COMBINER
4	COOLING UNIT (dual pumps)	9	BAND PASS FILTER (external, optional)
5	HEAT EXCHANGERS		

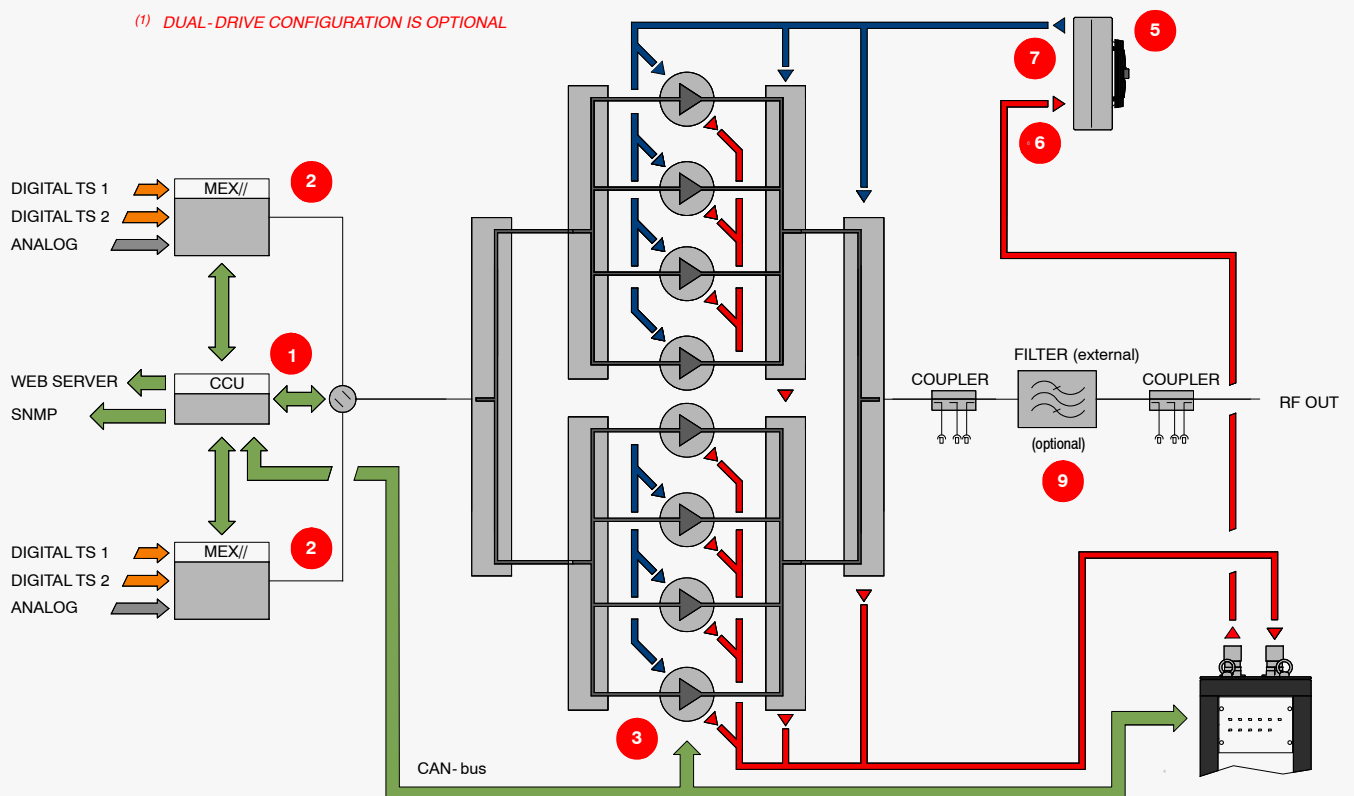
⁽¹⁾ DUAL-DRIVE CONFIGURATION IS OPTIONAL





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

⁽¹⁾ DUAL-DRIVE CONFIGURATION IS OPTIONAL





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