

LASERS. RESEARCH, TECHNOLOGY & DESIGN



Description

The laser system "InLight" was developed for measurements of temperature and density of electrons of hot plasma of tokamak. The system provides multipulse laser oscillation at a high repetition rate for multiple measurements of the electron parameters during a single plasma discharge.

The multipulse system *InLight* consists of laser source and electric power supply and control system (*MegaWatt*) with integrated water cooler.

The laser source is Q-switched ruby laser.

The Power Supply provides 1-3 high power electric bursts per cycle with 3-40 ms duration of each burst. During discharge of flash tubes, the laser generates a train of laser pulses with repetition rate up to 15 kHz.

The system was integrated with the TEXTOR tokamak (Juelich, Germany) at the end of year 2003.

Specifications:

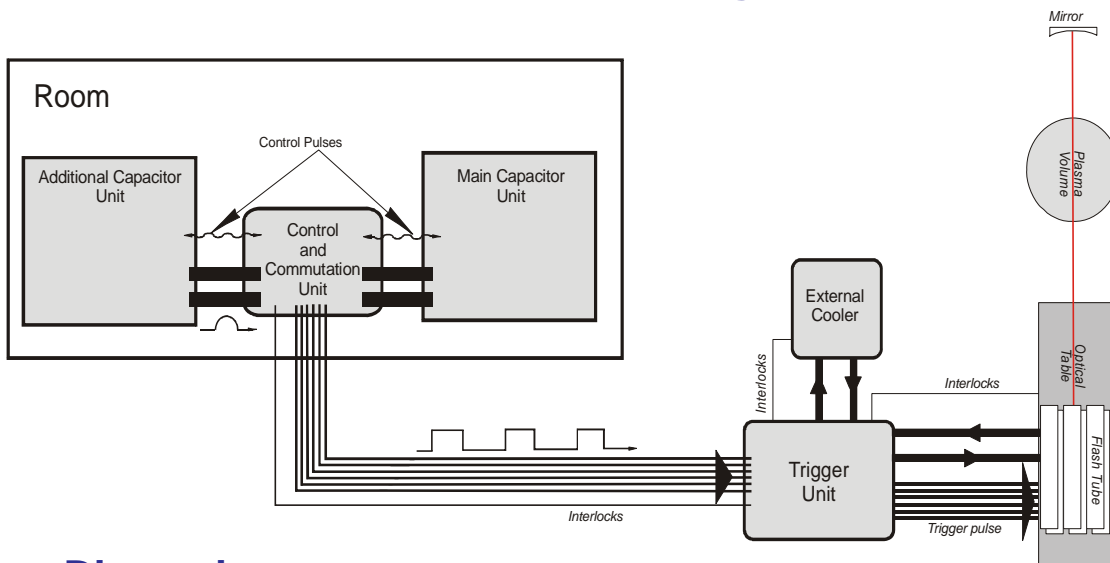
Power Supply

Main bank capacity	242 mF x 1200 V
Capacity of each additional bank	36 mF x 1600 V
Main bank voltage, max	1000 V
Voltage of each additional bank, max	1600 V
Capacitor Charging Power Supply charging power	1 kW
Number of discharge channels	6
Maximal discharge current per one channel	1 kA
Maximal current of additional bank discharge	9 kA
Current pulse shape	square wave
Current pulse duration	3-40 ms
Leading edge of current pulse	90% amplitude is achieved within 0.5 s
Flat top of the current pulse accuracy	within 3%
Charge voltage of banks before each cycle	preset within 1% accuracy
Initial charging time of banks	600 s
Recharging time between cycles	less than 210 s
Number of additional banks	3 (one bank per one burst)
Input power	220 VAC
Number of discharge bursts per one cycle	1-3

Optical System

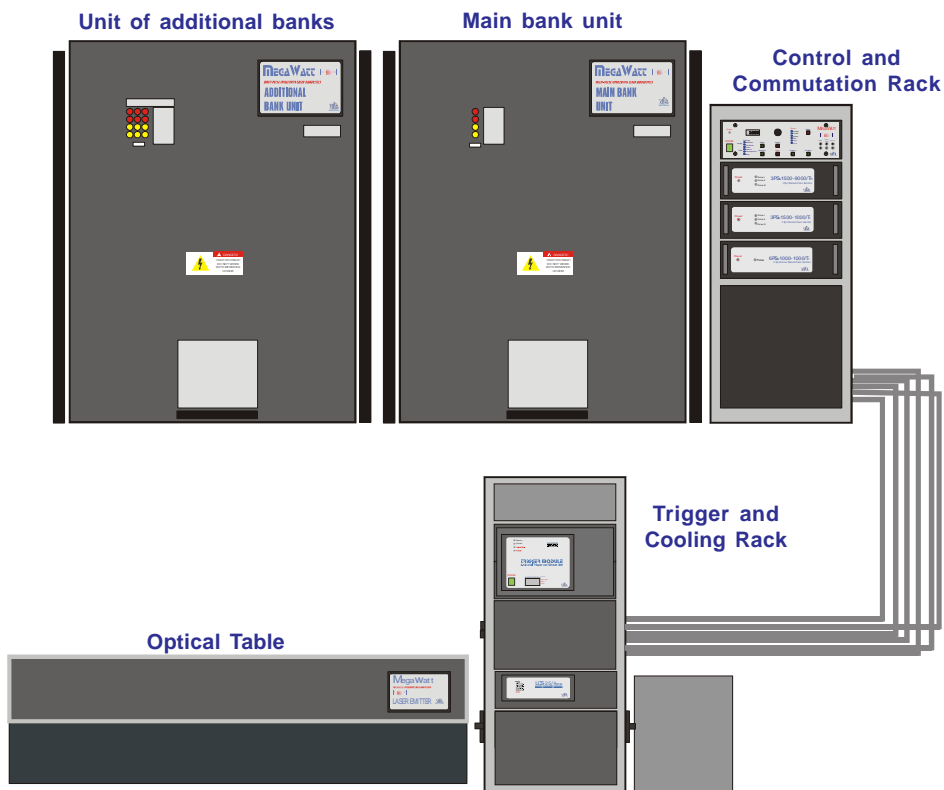
Number of flash tubes	6
The number of laser pulses per one burst	up to 40
Minimal time separation between pulses	66 ms
Pulse energy	up to 15 J
FWHM of pulse	0.6 ms
Divergence of laser beam	<0.5 mrad
Q-switch type	Active; Pockels cell

Operation scheme of plasma laser diagnostics



Dimensions

Main bank unit, L x W x H:	1200 x 1200 x 1600 mm
Unit of additional banks, L x W x H:	1200 x 1200 x 1600 mm
Control and commutation rack, L x W x H:	500 x 580 x 1200 mm
Trigger and cooling rack, L x W x H:	500 x 580 x 1200 mm
Laser table, L x W x H:	2000 x 400 x 200 mm



Weight

Main bank unit	800 kg
Unit of additional banks	900 kg
Control and commutation rack	160 kg
Trigger and cooling rack	70 kg
Laser table	120 kg