Experimental Setup:

Lab Setup:

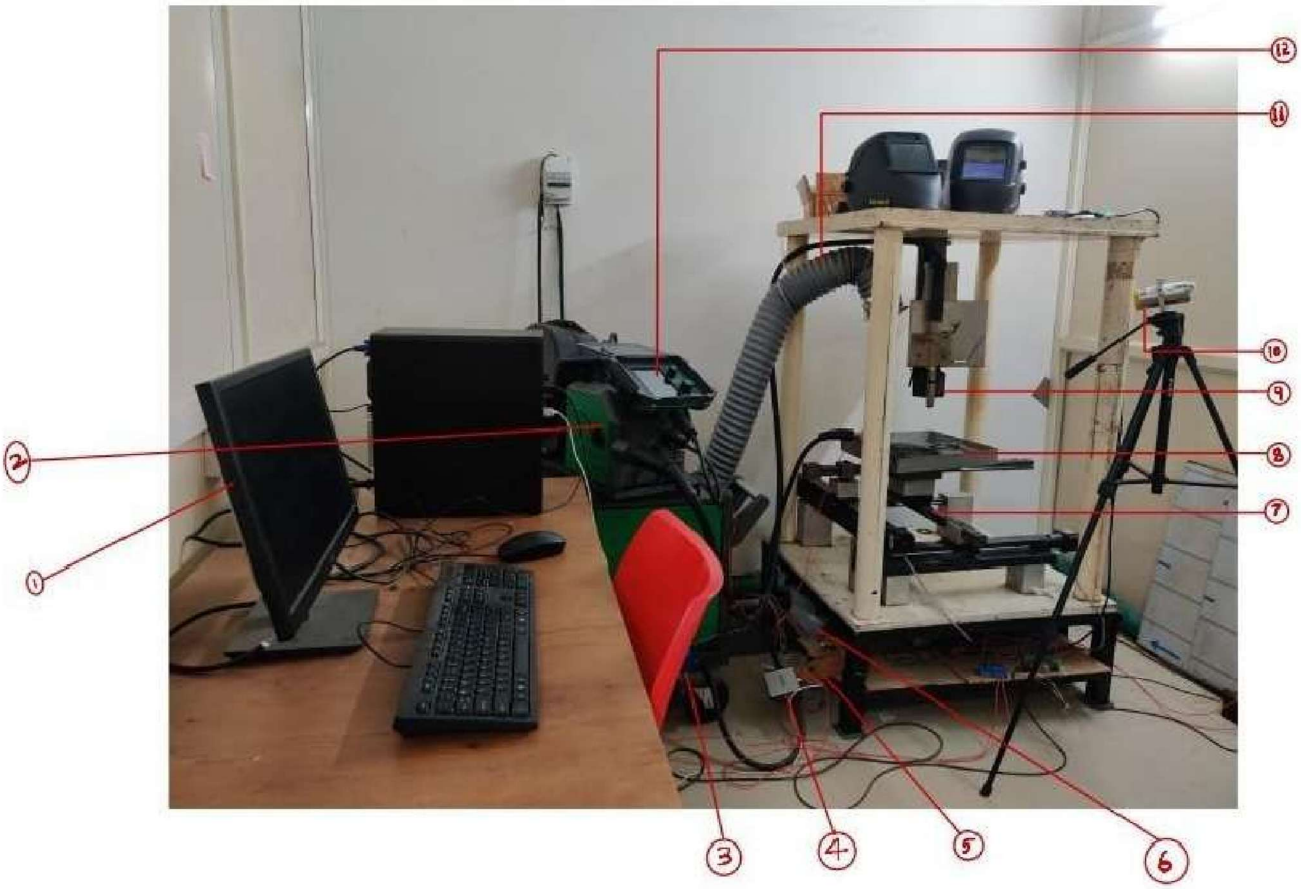

Fig . Lab Setup

1) Control system
2) MIG Machine
3) Hall Effect Sensor
4) NI USB 6001 DAQ
5) Current and Voltage sensing circuit
6) SMP Power supply
7) Stepper Motors
8) Substrate material(Low carbon steel AISI 1020)
9) Torch nozzle
10) Pyrometer 11) Gas Exhaust
12) Control panel

MIG Welding Setup:

MIG Machine: MIG machine used in our case is MIGATRONIC SIGMA SELECT 400

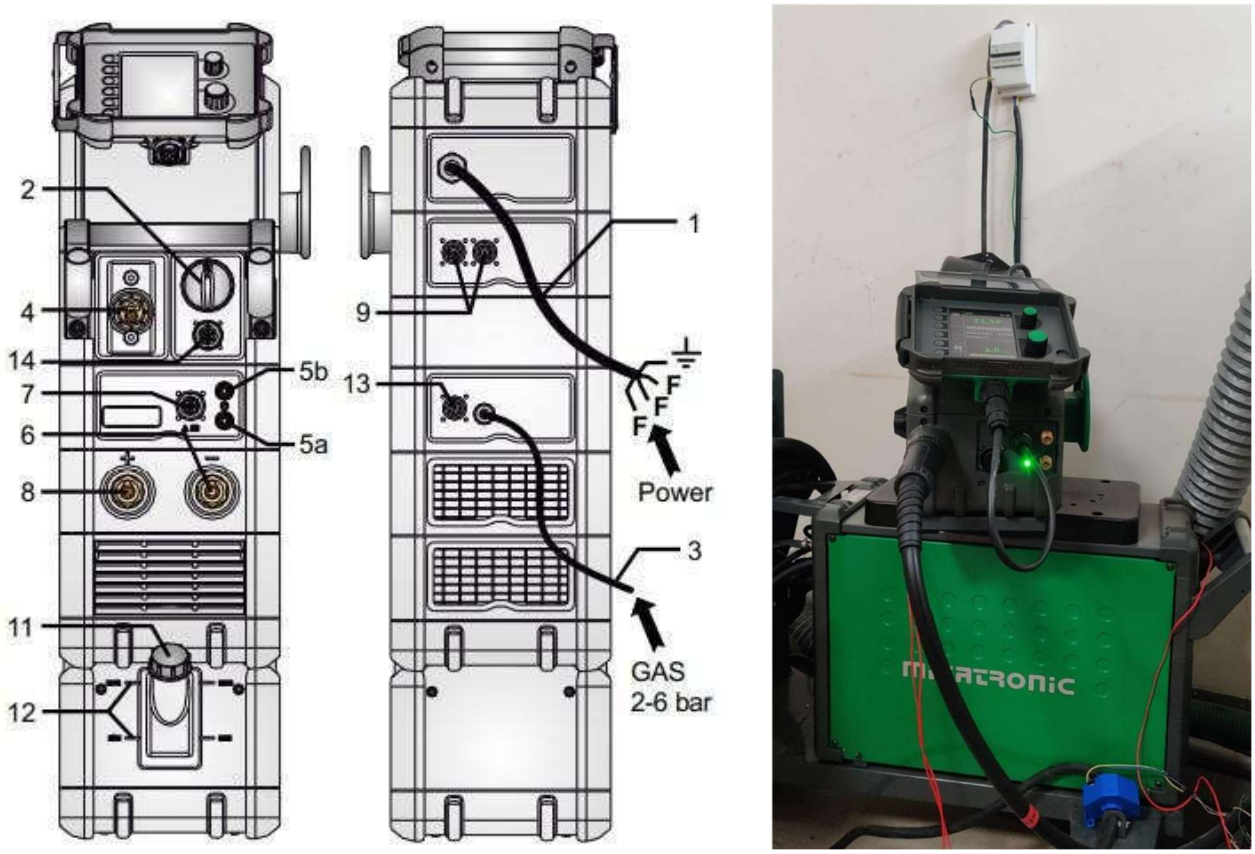

Fig . MIG Machine

1) Mains Connection
2) Power switch on/off
3) Connection of shielding gas
4) Connection of welding hose

5a) Connection of cooling hose, flow (blue)

5b) Connection of cooling hose, return (red)

6) Connection of earth clamp(MIG) or electrode holder (MMA)
7) Connection of remote control
8) Connection of earth clamp(MMA) or electrode holder (MMA)
9) CAN connection and MWF supply
10) Connection of intermediary cable

11) Refill of cooling liquid
12) Cooling liquid level control (Min/Max)
13) Analog remote control plug (Optional equipment)
14) Connection of IWF/Push Pull

MIG Torch: Mig torch comprises handle, trigger, nozzle, and contact tip, it enables a continuous feed of the consumable electrode wire. The wire serves as both electrode and filler material, melts at the arc's heat, forming a molten pool that solidifies to create a required weld part. Shielding gas is also supplied from the nozzle itself and helps in forming a smooth deposition.

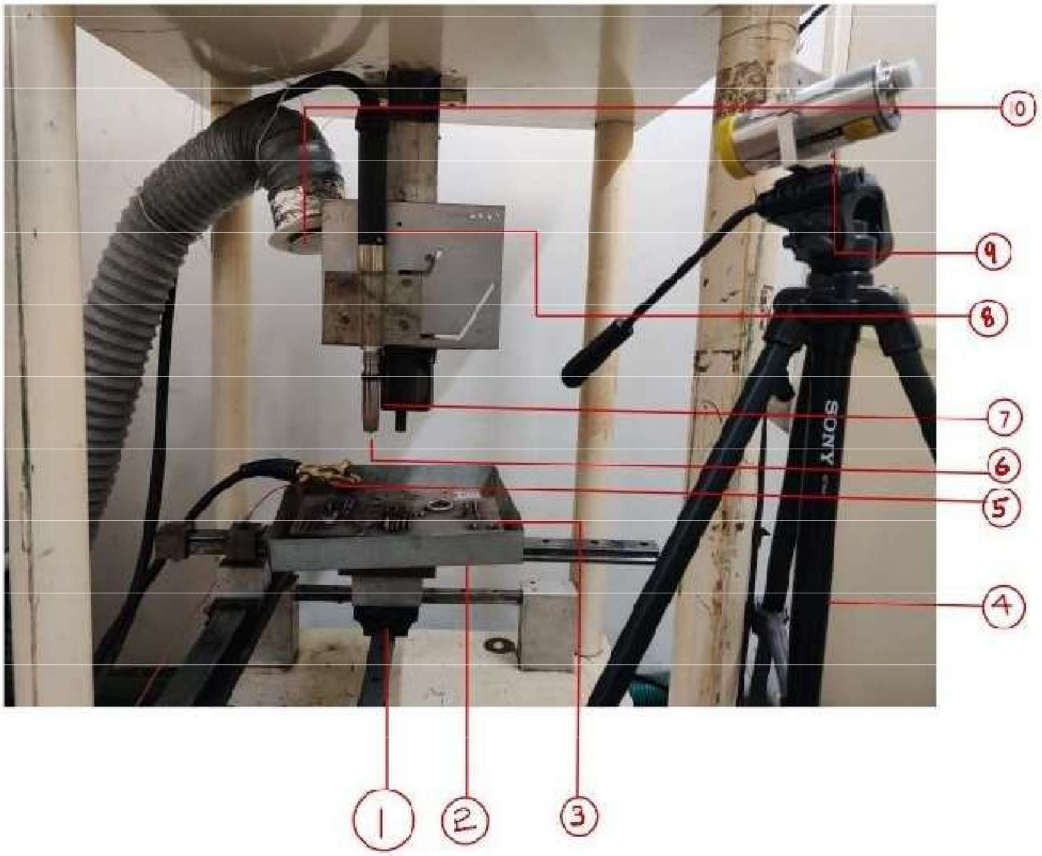

Fig . MIG Torch Setup

1) Stepper motor
2) Base plate
3) Substrate
4) Tripod
5) MIG -ve terminal
6) Deposition wire