

SMD Workshop with precise Solder Dispenser and SMD Component Manipulator

PAN, Feb. 21, 2016

1. Soldering Tools



Fig. 1: Workshop Overview

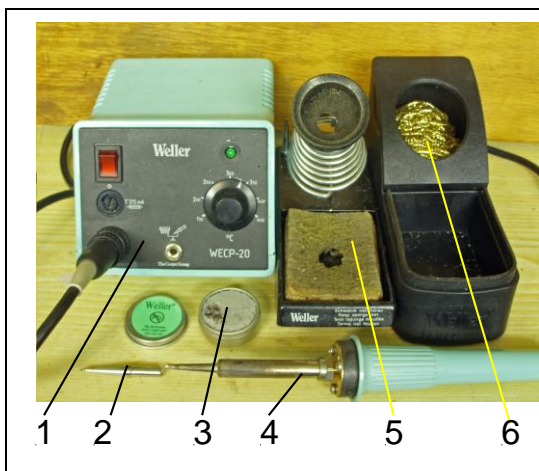


Fig. 2: Standard Soldering Equipment

- 1: Weller WECP-20
- 2: New solder tip, size 1 to 3 mm
- 3: Weller Tip Activator (Very useful!)
Wet hot tip with sponge, turn tip within the activator and the tip is ready again to accept solder!
- 4: Standard soldering iron
- 5: Wet sponge
- 6: Weller Dry Cleaner (Very useful, much better than the old fashioned sponge!)



Fig. 3: SMD Soldering Equipment

- 1: Metcal MFR-1100 Power Supply
Constant predefined temperature
- 2: Dry Cleaner and solder iron parking
- 3: Metcal MFR-H4-TW Tweezer
- 4: Metcal MFR-H1-SC2 Soldering & and Rework Cartridge Hand-piece



Fig. 4: Precision Dispenser

- 1: Input Air Source and Air filter
(not included , you need a compressor of 6 bar)
- 2: Metcal DX-250 Dispenser
- 3: Solder Syringe BLF03
Sn 96.5/Ag3/Cu0.5, 10 cm³, CHF 44.50
Can be stored at 20°C for about 6 months!
No need to store at lower temperature!
Distrelec Part Nr. 95 36 97
- 4: Foot switch, not shown here

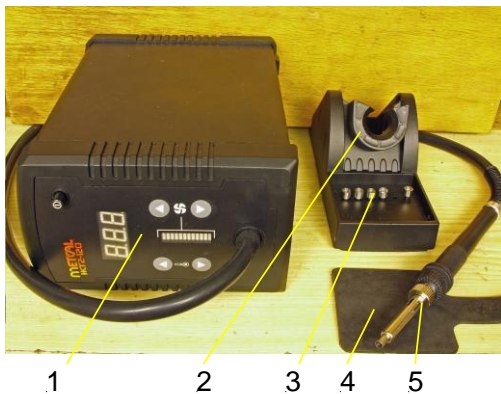


Fig. 5: Hot air soldering equipment

- 1: Metcal HCT2-120
Best use: air flow <1.5 l/min, < 400°C
- 2: Parking station, for sleep mode
- 3: Nozzles with other diameters
- 4: Heat insulator (Urgently needed!)
- 5: Hot air handle



Fig. 6. Desoldering/Soldering Equipment

- 1: AOYUE 701 Repairing System
- 2: Desoldering gun, quite ok
- 3: Cleaning needles for Desoldering gun
- 4: Soldering iron
- 5: Heat cartridge replacement

Comment: Poor quality!
- Temperature unstable (contact problems?)
- Solder/Desolder tips oxidized after short use

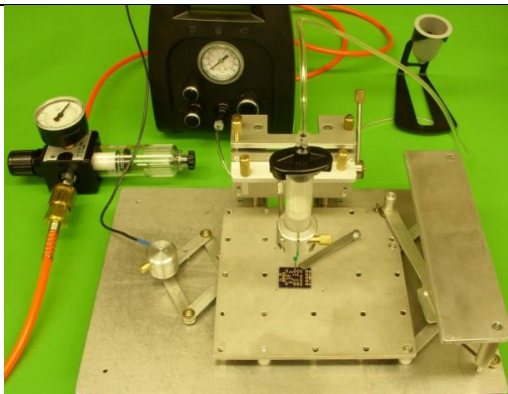


Fig. 7: Dispenser on Manipulator (with ext. 6 bar)

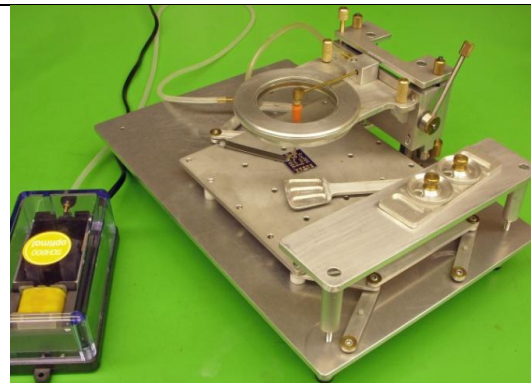


Fig. 8: Pick and Place Manipulator (with Vacuum)

2. Pick and Place Manipulator, also for solder dispenser

2.1. Introduction

This manipulator was developed some years ago for pick and place of tiny cylindrical SMD devices under stereo microscope supervision onto small PCBs.

The pantograph reduces the x-y motion by a factor 3 for precise component placing on the x-y moving platform. The working area on the platform is \varnothing 50 mm. Larger PCB can to repositioned and clamped onto the platform,

An additional application is the precise solder dispensing. The solder syringe of a professional solder dispenser will be clamped on the manipulator and the trigger for solder eject is integrated within the x-y position control knob.

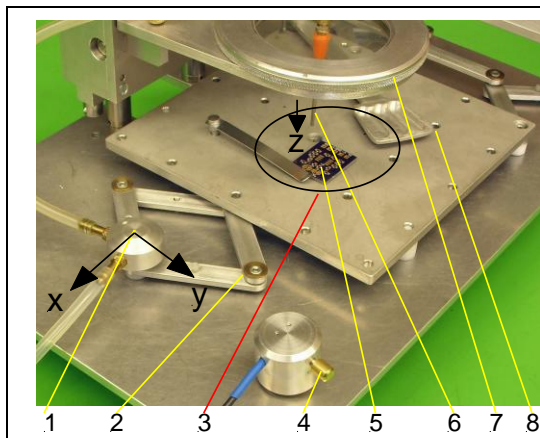


Fig. 9: Manipulator left view

- 1: Handle x-y for Pick and Place, with air inlet hole. Vacuum active if hole closed by finger tip.
- 2: Pantograph, speed reduction 3 to 1
- 3: Working area 50 mm diameter on platform
- 4: Handle x-y for dispenser, Trigger switch for solder eject.
- 5: PCB with pull down clamp
- 6: Pick and place needle, z-axis
- 7: Needle rotator
- 8: SMD component reservoir

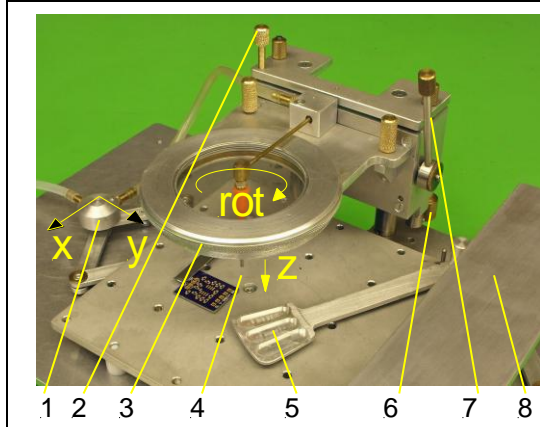


Fig. 10: Manipulator right view

- 1: Handle x-y for Pick and Place
- 2: Setting upper z-limit position
- 3: Needle rotator
- 4: Pick and Place needle
- 5: SMD component reservoir
- 6: Setting lower z-limit position
- 7: Needle pull-down lever
- 8: Shelf for ergonomic hand position



Fig. 11: Manipulator front overview

- 1: Vacuum pump, 2: Pantograph with platform,
- 3: SMD component reservoirs

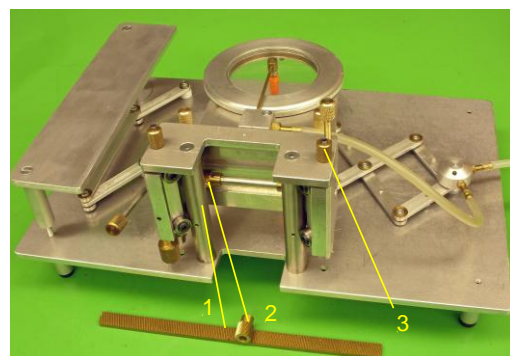


Fig. 12: Manipulator rear view

- 1, 2: Skew gear, free from play
- 3: Adjust knob for pull up spring force

2.2. Sketch of the dispenser mounting parts

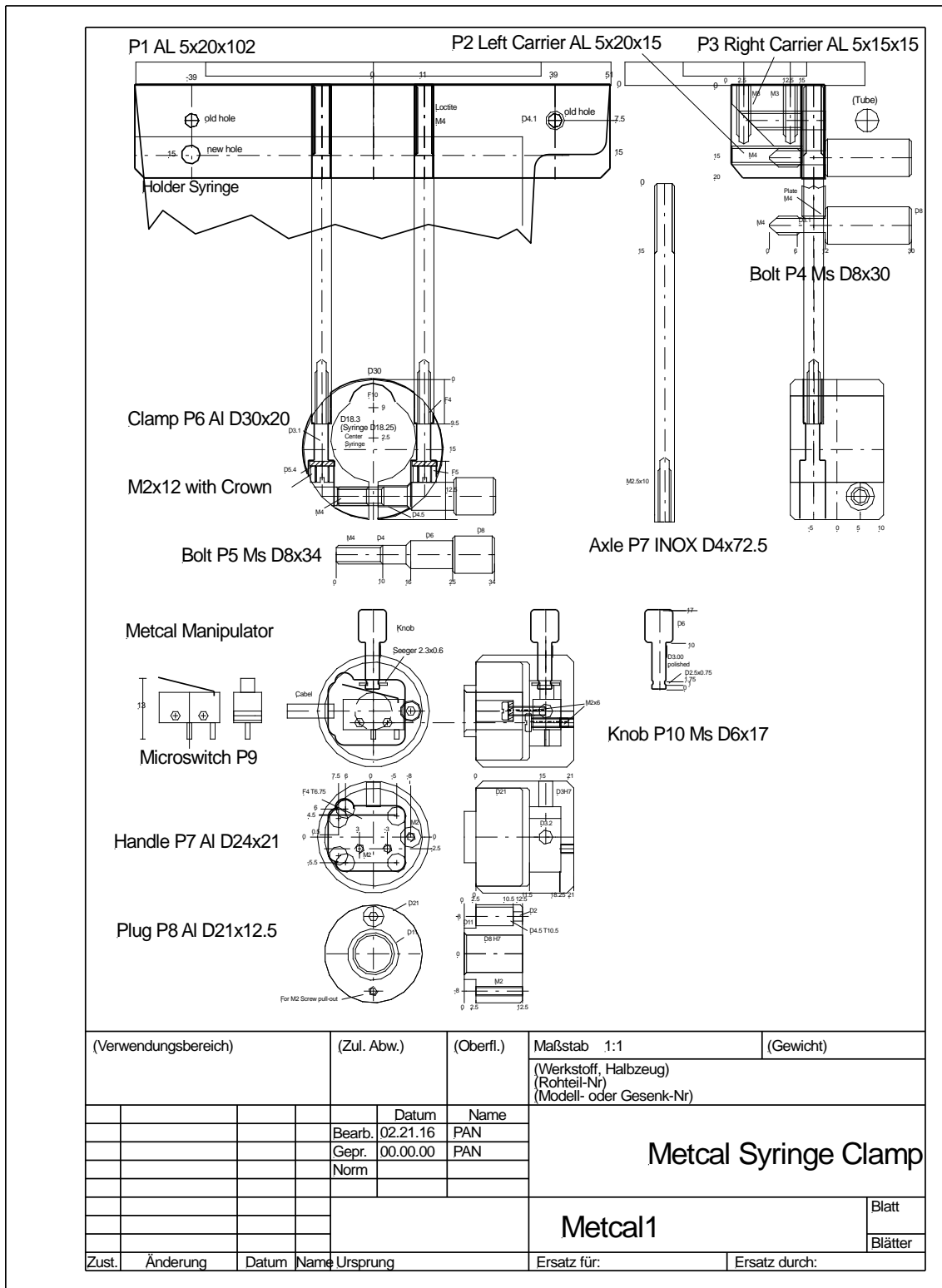


Fig. 13. Drawing of the parts for Metcal Dispenser