



## SPECIFICATION FOR TRADE FITTER (NSQF LEVEL V)TEMS





**Government of Maharashtra**  
**Directorate of Vocational Education and Training, Maharashtra State**  
**SPECIFICATION FOR TRADE-FITTER (NSQF-LEVEL V) Regional Office Nashik**

---

**VER-FT-01**  
**2021-22**

**Government of Maharashtra**

**VER-FT-01**

**Directorate of Vocational Education and Training, Maharashtra State**

**2021-22**

**SPECIFICATION FOR TRADE-FITTER (NSQF-LEVEL V) Regional Office Nashik**

---



**198- Pneumatic Trainer Kit, each consisting of the following matching components and accessories:**

As Per DVET, Maharashtra State ,SPECIFICATION FOR HYDRAULIC & PNEUMATIC TRAINING SYSTEMS GROUP-Version-1-2019-20 / ITEM-VOLUME -8) Page NO-8 to 10

**199- Pneumatic Workstation with 40 square mm aluminum profile legs, wooden work surface, and one pedestal drawer unit having 5 drawers, each with handles and individual locks, on metallic full panel drawer slide((1) Worktable – Size (Approx.) L1200mmXW900mmXH900 mm, with four castor wheels including two lockable wheels at the front side, (2) Drawer – Size (Approx.) – L460mmxW495mm xH158mm each, and overall**

199.1 Basic Indicative Diagram:



Sr. No	Features / Specification / Accessories
1.	All valves and other components should be mounted on FRP/Plastic plate (of 80 mm X 130 mm size/ suitable size) fitted with plastic base (to avoid scratching on the Aluminum anodized work table) and with inbuilt button operated Push-to-lock/ unlock mechanism for easy

## SPECIFICATION FOR TRADE-FITTER (NSQF-LEVEL V) Regional Office Nashik

	clamping & unclamping with the work table.
2.	Should use actual new industrial standard valves and components like Air Distribution & Manual control, Control Element, Actuating devices, Logic Control, Flow control & Accessories should be of reputed make like Bosch Rexroth, Festo, SMC, Janatics, Emerson etc.
3.	Profile plate: 1 No
4.	Work station with vertically mounted Frame unit (made of extruded aluminum profiles) with provision to work on both sides of the work station with Component Storage box having four shelves & locks,
5.	Overall occupied Size (W x H x D): 800 mm X 1300 mm X 750 mm
6.	Effective work area per side on the Frame unit: 800 mm X 700 mm
7.	Profile groove width: 102 mm
8.	Groove to groove distance: 20 mm
9.	Material: Aluminum, anodized finish
10.	<b>Foot base: Castor Wheels with locking arrangement, load caring capacity of 300 Kgs.</b>
11.	Flow & Pressure Regulator (FRL) unit with pressure gauge (10 bar), 1/4" 9BSP(F): 1 No
12.	Manifold 4 way, 1/4" BSP (F) with 4 ball on/off valve: 1 No
13.	One-way flow control adjustable valve: 1 No
14.	Ball valve 1/4" BSP for ON-OFF [M-F]: 1 No
15.	Silencer: 1 No
16.	3/2 way directly actuated valve with push button, M5, 1/8 or 1/4 " BSP (F)
17.	3/2 way single pilot valve, M5, 1/8 or 1/4" BSP (F)
18.	5/2 way valve with roller lever valve, M5, 1/8 or 1/4" BSP (F)
19.	5/2 way pilot operated spring return valve, M5, 1/8 or 1/4" BSP (F)
20.	5/3 way double pilot valve (with manual override), M5, 1/8 or 1/4" BSP (F)
21.	3/2 way roller lever valve, M5, 1/8 or 1/4" BSP (F)
22.	3/2 way directional control valve with 24V DC operated
23.	5/3 way directional control valve mid position closed, hand-lever operated
24.	5/2 way directional control valve, hand-lever operated
25.	5/2 way directional control valve with 24V DC operated, spring return
26.	Single acting cylinder - Bore 25 mm, Stroke 100mm: 2 No
27.	Double acting cylinder Bore 25 mm, Stroke 150mm: 2 No
28.	Pneumatic motor: The component should be an application of pneumatic motor in an industry, Maximum pressure – 10 Bar: 1 No
29.	OR gate / shuttle valve 1/8" BSP (F): 1 No
30.	AND gate 1/8" BSP (F): 1 No
31.	One way flow control valve, inline type: 2 Nos
32.	Non return valve, Brass/Aluminum body: 2 No
33.	Pneumatic Counter Balance Valve, The counterbalance valve will hold a load in position until

## SPECIFICATION FOR TRADE-FITTER (NSQF-LEVEL V) Regional Office Nashik

	pressure is applied to move the load, Turning the adjusting screw clockwise will increase the load carrying capacity of the valve, Pressure Range: 1 to 8 bar, Max Pilot Pressure: 7 bar: 1 No
34.	Weight + Protection Hood, To suit double acting pneumatic cylinder, With weight, 10 Kg: 1 No
35.	Suitable PU tube, Red Blue and Yellow color, 20 meter each
36.	T-Connector: 4 Nos
37.	Pneumatic Quick change couplers (one touch fittings) mounted on each pneumatic component The fittings should be suitable for 4 mm/ suitable OD PU tube
38.	Mains cord with stackable connection
39.	All Components must be with quick release coupling for easy to lock and unlock
40.	1HP 35- 50 Ltr. Capacity, Twin Cylinder Silent Compressor
41.	Air Compressors Displacement: 3 cfm or more
42.	Working Pressure: 7 kg/cm <sup>2</sup> (7 Bar)
43.	Electric Motor: 01 HP or more, 1440 RPM, 230 V/ 50Hz, Single Phase
44.	Bar gage & shut off valve with 8 mm Brass male connector hose
45.	Safety Valve
46.	Pressure Switch
47.	Storage Tank: 35-50 liter
48.	5/2 way Hand Lever Operated Valve
49.	3/2 way Roller Lever Actuated Valve
50.	5/2 way Solenoid Operated Spring Return
51.	5/2 way Double pilot Valve
52.	Quick Exhaust Valve
53.	One-Way Flow Control Adjustable Valve
54.	OR Function valve
<b>Experiments:</b>	
1.	Working of Air filter, Lubricator & Regulator
2.	Use of manifold block
3.	Working of Single acting cylinder
4.	Working of Double acting cylinder
5.	Working of 5/2 way valve
6.	Working of 5/3 way mid position closed
7.	Working of 5/2 way double pilot valve air operated with manual override
8.	Working of one way flow control valve
9.	Working of 5/2 way valve solenoid operated
10.	Working of OR gate / Shuttle valve
11.	Working of AND gate
12.	Working of counter balance circuit
13.	Working of silencer
14.	Working of Indirectly actuation of single acting single
Instructional Manuals and an Exercise :	

1. Operation manual
2. Exercise / Experiment manual with at least 25 experiments. (Manual should be provided with each system Detailed, theory and practical exercises should be included in the Exercise Manual)
<b>Simulation Software</b>
Step by step Animation of the operation & working of the Pneumatic Training system must to be supplied
Pneumatic circuit design and simulation software with perpetual license
Software should be able to simulate / design a complete Hydraulic circuit
All components used in the trainer kit should be available in the software library
Students should be able to design a Pneumatic circuit that they are executing on the Pneumatic trainer kit
Software should completely simulate the circuit and mention the flaws in the designed circuit
An executable file should be generated of the simulated Pneumatic circuit which can be opened on any computer (Even on computers without the license of this software)
All circuits performed on the training kit should be dynamically demonstrated on the software. Students should be able to simulate the circuits on the software before executing them on the hardware kit.
Software License Type: (perpetual)



## 200- Hydraulic Trainer Kit, each consisting of the following matching

### Components and accessories:

As Per DVET, Maharashtra State ,SPECIFICATION FOR HYDRAULIC & PNEUMATIC TRAINING SYSTEMS GROUP-Version-1-2019-20 / ITEM-VOLUME -2) P. NO-5 To 7

**201- Hydraulic Workstation with 40 square mm aluminum profile legs, wooden work surface, and one pedestal drawer unit having 5 drawers, each with handles and individual locks, on metallic full panel drawer slide:**

#### 201.1 Basic Indicative Diagram



#### 1. Features:

Features / Specification / Accessories
Use of Mild Steel/ Aluminum Extrusion table with shelves (3 Nos.) to store components when not In use. Mounted on 4 Nos. of caster wheels for free movement. Work station with vertically mounted Frame unit should be made of Aluminum Extrusion / Mild Steel.
Overall occupied Size (W x H x D): 1000 mm X 1300 mm X 800 mm,
Working area Frame dimensions : 1000 mm x 700mm



Working area grid : 50 mm X 50 mm
Material : SS,5 mm Diameter
Oil Collection Tray: 02 Nos. (01 no for hydraulic power pack of SS material) Mounted on the horizontal plane of the work station, Made of Stainless Steel, 14 SWG with oil drain arrangement).
Quick release socket plug arrangement for building circuits, All hydraulic components are mounted using lever operated moulded adapters or hook-in type adapters for quick release & placement.
Industrial standard Valves and all components of reputed make like Bosch Rexroth, Eaton, Hydec, Parker, Yuken and THM etc. should be used for the trainer kit.
All the components are fixed with Non corrosive material QRC for easy and quick hydraulic connections.
All Quick Release Fittings used are with double check valve, '1/4" BSP connection
Oil Distribution: Manifold: Sub plate (1 station manifold) with 4 ports: 02No.
Pressure relief valve (sub plate mounted) with 40Bar : 01No
Pressure relief valve (in-line type) with 40 Bar: 01No.
Glycerin filled pressure gauge with facility to connect to A, B, P or T ports: 02Nos.
Throttle cum check valve sub plate mounted: 01No.
Throttle cum check valve in-line mounted: 01No.
4/2 way DC valve lever operated spring return, sub plate mounted : 02 Nos.
4/3 way DC valve, lever operated spring return, sub plate mounted: 01 No.
4/3 way DC valve lever operated detend, sub plate mounted : 01 No.
3/2 Stem actuated valve, sub plate mounted : 02 Nos.
4/2 way DC valve, 24 VDC solenoid operated spring return : 01 No
4/3 way DC valve, 24 VDC, Spring Centered, Closed center, solenoid operated spring return : 01 No.
4/3 way DC valve, 24VDC, Spring Centered, Tandem Centre, solenoid operated spring return : 01 No
Double acting cylinder 40mm X 150 mm stroke : 02 Nos.
Bidirectional Hydraulic motor : 01 No.
Single acting cylinder 40 mm x 150 mm stroke : 01 no
Non Return Valve inline Type, Size 1/4" : 01 No
Non Return Valve Sub-plate mounting type : 01 No

Pressure Sequence, Valve, and Max operating Pressure: 40Bar, Sub plate mounting type: 02 Nos.
Pressure Relief Valve, <b>Max. Pressure 50 Bar</b> , Knob/screw operated, Size: 1/4" inline type, with QRC, Vendor should be able to demonstrate the operation of this valve from 20 bar to 50 bar at different settings.
Pressure Reducing Valve, Max operating Pressure:40bar, Sub-plate mounting type : 02 Nos.
Flow divider Valve, Threaded body, Pressure compensated spool, 50:50 ratio, Inlet flow 10 LPM (max) : 01 No
Weight + Protection Hood, 10 kg, To suit hydraulic cylinder 01 No
Accumulator: 01 No Should be of reputed Make like Bosch Rexroth, Eaton, Hydec, Parker, Yuken, etc. Diaphragm type, Capacity : 1 liter Working pressure : 20 kg/cm <sup>2</sup> Pre-charge pressure: 35 kg/cm <sup>2</sup> , Nitrogen gas, With Safety Block With valve and QRC
Flexible hoses, R1 type 1/4" ID with Quick release sockets on both ends.
Length 1000 mm : 08 Nos.
Length 1500 mm : 02 Nos.
T-Connector with one Female QRC socket and two male QRC plugs : 06 Nos.
Mains cord for 230 V AC 2.20.2 Solenoid Cables: 20 Nos.
Should comprise of 24VDC power supply with current rating of minimum 4.SAmps, Distributor for 24V and GND (minimum 6 points each), 1 x toggle switch with 1 NO and 1 NC contacts, 3 X push button switch with 1 NO and 1 NC contacts 1 2 X LED Indicators for connecting outputs of the circuit, 1 X buzzer for connecting outputs of the circuit, 5 X 3 change over relays, 1 X 1 change over relay, 1 X On delay timer with 1 NO and 1 NC contact, 1 X OFF delay timer with 1 NO and 1 NC contact.
Power pack (50 Bar) consist of Gear Pump with minimum 10 LPM Relief valve. Electric Motor:1.0 HP 1440 RPM 230VAC Cast Aluminum Tank: 40 liters Oil Breather Oil level indicator Suction filter/ Strainer Gear Pump & Relief valve.
4/3 Way lever Operated 3 position Valve

4/3 Solenoid Operated NG06/Cetop 3 Valve,
Closed Centered
Tandem Center
Non Return Valve
Pressure Relief Valve, sub plate mounted type with knob to set pressure
Shut off valve,
External Gear Pump
Diaphragm Accumulator : 1 liter
Flow control Valve
Line operated Check valve
Study of Hydraulic Power pack
Study of Pressure Relief valve
Study of Directional control valve
Study of D.A. Cylinder
Study of S.A. cylinder
Study of Meter in/out flow control
Study of Regenerative circuit
Study of Bleed of Circuit
Study of direct operated pressure relief valve
<b>Training Material</b>
Instructional Manuals and an Exercise : 1. Operation manual 2. Exercise / Experiment manual with at least 25 experiments. (Manual should be provided with each system Detailed, theory and practical exercises should be included in the Exercise Manual)
<b>Simulation Software</b>
Step by step Animation of the operation & working of the Hydraulic Training system must to be supplied
Hydraulic circuit design and simulation software with perpetual license
Software should be able to simulate / design a complete Hydraulic circuit
All components used in the trainer kit should be available in the software library
Students should be able to design a Pneumatic circuit that they are executing on the Hydraulic trainer kit
Software should completely simulate the circuit and mention the flaws in the designed circuit
An executable file should be generated of the simulated Hydraulic circuit which can be opened on



**Government of Maharashtra**  
**Directorate of Vocational Education and Training, Maharashtra State**  
**SPECIFICATION FOR TRADE-FITTER (NSQF-LEVEL V) Regional Office Nashik**

**VER-FT-01**  
**2021-22**

any computer (Even on computers without the license of this software)

All circuits performed on the training kit should be dynamically demonstrated on the software.  
Students should be able to simulate the circuits on the software before executing them on the hardware kit.

Software License Type: (perpetual)



