

Piping Learning System

580150 (46105-00)

FESTO

LabVolt Series

Datasheet



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General Description

Teach the fundamentals of pipe fitting with a compact and turnkey solution

This system is designed to learn the skills to prepare and install pipes and hoses found in industrial installations that are essential to safely carry liquids and gases. The workstation can accommodate two teams of students when the second team add-on is selected.

Features & Benefits

- Compact design
- Closed-loop recirculating water circuit with drip tray to keep the floor dry
- Commercial-grade equipment for a realistic learning experience
- Turnkey solution with necessary pipes, hoses, fittings and tools

List of Equipment

Qty	Description	Model number
1	Pumping Unit	579984 (46750-00)
1	Supports	579986 (46751-00)
1	Storage Space	579989 (46752-00)
1	Pipe Hangers	763415 (46753-00)
1	Flowmeter GPM	579990 (46760-00)
1	Pressure Gauge – 210 kPa (30 psi)	579992 (46761-00)
1	Piping Accessories	579994 (46780-00)
1	Piping Tools	579997 (46781-00)
1	Steel and Iron Pipes	579998 (46782-00)
1	PVC Pipes	579999 (46782-A0)
1	Hoses	580000 (46782-B0)
1	Tubes	580001 (46782-C0)
1	Steel and Iron Pipe Fittings	580002 (46783-00)
1	PVC Pipe Fittings	580003 (46783-A0)
1	Hose Fittings	580004 (46783-B0)
1	Tube Fittings	580005 (46783-C0)
1	Valves	580006 (46784-00)
1	Instrumentation Accessories	580007 (46785-00)
1	Piping Textbooks	580008 (46786-00)
1	Mobile Workstation, Piping	580033 (46801-A0)

List of Manuals

Description	Manual number
Piping Fundamentals (Work Orders - Student) _____	580443 (39162-60)
Piping Fundamentals (Work Orders - Instructor) _____	580445 (39162-70)
IPT's Pipe Trades (Student Manual) _____	584854 (39330-00)

Table of Contents of the Manual(s)

Piping Fundamentals (Work Orders - Student) (580443 (39162-60))

- 1 Installation of Metal Struts on the Mobile Workstation
- 2 Identification of Pipes, Fittings, Valves, and Hangers
- 3 Piping Circuit Layout and Measurement
- 4 Pipe Length Calculation
- 5 Cutting, Reaming, and Threading Steel Pipes
- 6 Identification, Insulation, and Assembly of a Steel Pipe Circuit Using Threaded Fittings
- 7 Assembling a Hose Circuit Using Barb Fittings and Clamps
- 8 Assembling a PVC Pipe Circuit Using Cemented Fittings
- 9 Assembling a Copper Tube Circuit Using Flare Fittings

Optional Equipment

Qty	Description	Model number
1	Piping Training System (Manuals on CD-ROM) _____	580441 (39162-A0)
1	Piping Training System (Second Team, Add-On to 46105-0 and -B) _____	580156 (46105-C0)
1	Piping Accessories _____	579994 (46780-00)
1	Piping Consumables _____	583478 (46789-00)

System Specifications

Parameter	Value
Power Requirements	
Current	7.4 A
Physical Characteristics	
Intended Location	On the floor (stands on casters)
Dimensions (H x W x D)	1830 x 1980 x 800 mm (72 x 78 x 31.5 in)
Net Weight	TBE

Equipment Description

Pumping Unit 579984 (46750-00)



The Pumping Unit is designed to be installed in the Mobile Workstation. It contains a motor-pump assembly, a reservoir, and a disconnecting switch. The pump is connected to the reservoir via a strainer, ball valve, and pressure measurement point. The pump is controlled by a Start/Stop push-button station protected by a disconnecting switch with lockout/tagout devices. The Pumping Unit and the Mobile Workstation form a stand-alone pumping system that is used to test the piping circuits for leaks.

Specifications

Parameter	Value
Power Requirements	
Current	7.4 A
Service Installation	Standard single-phase ac outlet
Pump	
Type	Centrifugal
Flow	53 L/min (14 gal US/min) at 10 m (30 ft)
Maximum Pressure	16.1 m (53 ft)
Maximum Speed	3450 r/min
Motor	
Power	375 W (1/2 hp)
Current	7.4 A
Speed	3450 r/min
Electrical Protection	
Type	Fuses
Tank	
Capacity	115 L (30 gal US)
Accessories	
Accessories	Rust inhibitor
	Antibacterial solutions
Physical Characteristics	
Intended Location	Installed in the lower part of the Piping Training System workstation
Dimensions (H x W x D)	340 x 655 x 655 mm (13.5 x 25.8 x 25.8 in)
Net Weight	5.9 kg (12.8 lb)

Supports 579986 (46751-00)



The Supports set includes all the struts, position guides, tube supports, brackets, storage pan, and accessories required to set up the piping circuits and store the components.

Specifications

Parameter	Value
Small Struts	
Number	6
Length	15.2 cm (6 in)
Medium Struts	
Number	6
Length	30.5 cm (12 in)
Long Struts	
Number	4
Length	101.6 cm (40 in)
Positioning Guides	
Number	3
Included Installation Accessories	Bolts, nuts, washers, spring nuts, angles, protective caps

Storage Space 579989 (46752-00)

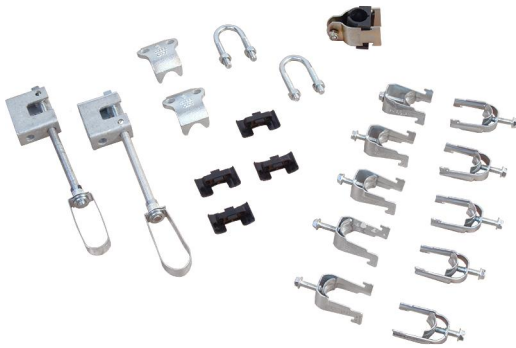


The Storage Space set contains the components required to store the fittings, pipe samples, pipe hangers, and mounting accessories. This includes storage bins installed on a louvered steel panel. The louvered steel panel mounts on the side of the Mobile Workstation.

Specifications

Parameter	Value
Small Bins	
Number	9
Dimensions (H x W x D)	75 x 105 x 135 mm (3 x 4 1/8 x 5 3/8 in)
Medium Bins	
Number	3
Dimensions (H x W x D)	75 x 105 x 190 mm (3 x 4 1/8 x 7 3/8 in)
Large Bins	
Number	3
Dimensions (H x W x D)	125 x 145 x 280 mm (5 x 5 3/4 x 11 in)
Installation Accessories	Bolts, nuts, washers, spring nuts, angles, screws, louvered steel panel

Pipe Hangers 763415 (46753-00)



The Pipe Hangers set includes four types of pipe clamps and one type of pipe hanger. These types of hangers are commonly used in the industry to support pipes and tubes.

Specifications

Parameter	Value
Pipe Hanger with Beam Attachment and Adjustable Ring	
Number	2
Pipe Clamp, Attach to Metal Struts, with Vibration Cushion	
Number	2
Pipe Clamp, Attach to Metal Struts, with Tie Wraps	
Number	4
Pipe Clamp, Attach to Metal Struts	
Number	2
Pipe Clamp, Attach to Beams	
Quantity	2

Flowmeter GPM 579990 (46760-00)



The Flowmeter GPM provides direct visual reading of the flow rate. It has a 0-20 gal US/min flow range. The Flowmeter GPM is fixed to a mounting bracket to be attached to metal struts.

Specifications

Parameter	Value
Flow Range	0-75 L/min (0-20 gal US/min)
Maximum Pressure	1000 kPa (150 psig)
Accuracy	3%
Physical Characteristics	
Dimensions (H x W x D)	240 x 63 x 89 mm (9.5 x 2.5 x 3.5 in)
Net Weight	0.91 kg (2.0 lb)

Pressure Gauge – 210 kPa (30 psi) 579992 (46761-00)



The Pressure Gauge provides a direct visual reading of the measured pressure. The Pressure Gauge is fixed to a mounting bracket to be attached to metal struts. It has a maximum operating pressure of 210 kPa (30 psi). A version with a maximum operating range of 700 kPa (100 psi) is also available: Model 46761-A.

Specifications

Parameter	Value
Maximum Operating Pressure	210 kPa (30 psi)
Units	kPa, psi
Physical Characteristics	
Dimensions (H x W x D)	140 x 140 x 60 mm (5.5 x 5.5 x 2.3 in)
Net Weight	0.73 kg (1.6 lb)

Piping Accessories 579994 (46780-00)



The Piping Accessories set contains various accessories required to set up the piping circuits. It contains a pipe and tube gauge, mounting hardware, cutting and tapping oil, PVC cement and primer, an identification tape, a marker, and a thread seal tape.

Specifications

Parameter	Value
Accessories	Bolts, nuts, washers, spring nuts, angles, gauges, thread seal tape, taping oil, yellow tape, marker, PVC primer, and solvent.

Piping Tools 579997 (46781-00)



The Piping Tools set contains all the specialized tools required to fabricate and install the piping circuits. It is not included with the second team additions, Models 46105-C and 46105-D.

Specifications

Parameter	Value
Tools	Pipe cutter, 12.7 mm (1/2 in) die, pipe threader, pipe reamer, pipe vise, PVC cutter, PVC reamer, tube cutters, tube bender, flaring tool, bending spring, wrenches, level, measuring tape, file, level, tool box.

Steel and Iron Pipes 579998 (46782-00)



The Steel and Iron Pipes set contains the steel and iron pipes required to learn how to fabricate steel pipe circuits. It also includes pipe insulation.

Specifications

Parameter	Value
Black Iron Pipe, 19.1 mm (3/4 in) NPS	
Length	150 mm (6 in)
Galvanized Steel Pipe, 19.1 mm (3/4 in) NPS	
Length	150 mm (6 in)
Galvanized Steel Pipe, 25.4 mm (1 in) NPS	
Length	150 mm (6 in)
Galvanized Steel Pipe, 12.7 mm (1/2 in) NPS	
Length	19200 mm (756 in)
Pipe Insulation for Pipe, 12.7 mm (1/2 in) NPS	
Length	1800 mm (72 in)

PVC Pipes 579999 (46782-A0)



The PVC Pipes set contains the PVC pipes required to learn how to set up PVC pipe circuits.

Specifications

Parameter	Value
PVC Pipe, 19.1 mm (3/4 in) NPS	
Length	150 mm (6 in)
PVC Pipe, 9.53 mm (3/8 in) NPS	
Length	150 mm (6 in)
PVC Pipe, 12.7 mm (1/2 in) NPS	
Length	6000 mm (240 in)

Hoses

580000 (46782-B0)



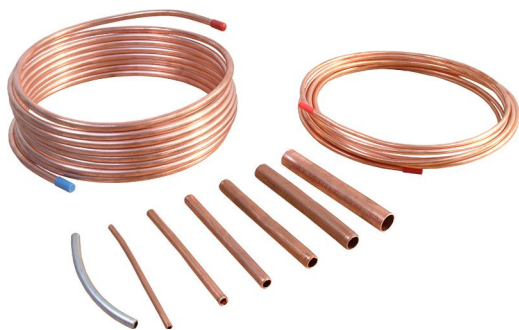
The Hoses set contains the hoses required to learn how to set up piping circuits using hoses.

Specifications

Parameter	Value
Hoses, 6.35 mm (1/4 in) I.D.	
Length	150 mm (6 in)
Hoses, 12.7 mm (1/2 in) I.D.	
Length	150 mm (6 in)
Hoses, 19.1 mm (3/4 in) I.D.	
Length	150 mm (6 in)
Hoses, 25.4 mm (1 in) I.D.	
Length	150 mm (6 in)
Hoses, 9.53 mm (3/8 in) I.D.	
Length	7600 mm (300 in)

Tubes

580001 (46782-C0)



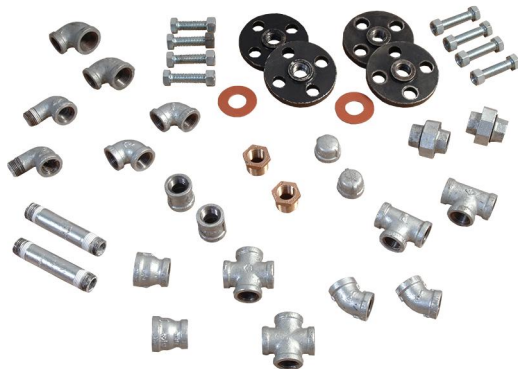
The Tubes set contains the copper and steel tubes required to learn how to set up piping circuits using tubes.

Specifications

Parameter	Value
Copper (soft), 9.53 mm (3/8 in) O.D.	
Length	7600 mm (300 in)
Copper (soft), 6.35 mm (1/4 in) O.D.	

Parameter	Value
Length	7600 mm (300 in)
Steel (soft), 9.53 mm (3/8 in) O.D.	
Length	150 mm (6 in)
Copper (soft), 12.7 mm (1/2 in) O.D.	
Length	150 mm (6 in)
Copper (rigid), 22.2 mm (7/8 in) O.D.	
Length	150 mm (6 in)
Copper (soft), 15.9 mm (5/8 in) O.D.	
Length	150 mm (6 in)
Copper (rigid), 19.1 mm (3/4 in) O.D.	
Length	150 mm (6 in)

Steel and Iron Pipe Fittings 580002 (46783-00)



The Iron and Steel Pipe Fittings set contains a large selection of fittings commonly used with iron and steel pipes.

Specifications

Parameter	Value
Street Elbow, 90°, 12.7 mm (1/2 in), Malleable Iron Threaded	
Number	4
Reducing Elbow, 90°, 12.7 mm (1/2 in), Malleable Iron Threaded	
Number	2
Elbow, 45°, 12.7 mm (1/2 in), Malleable Iron Threaded	
Number	6
Elbow, 90°, 12.7 mm (1/2 in), Malleable Iron Threaded	
Number	8
Union - Ground Joint, 12.7 mm (1/2 in), Malleable Iron Threaded	
Number	6
Union - Flange, 12.7 mm (1/2 in), Forged Steel	
Number	2
Coupling, 12.7 mm (1/2 in), Malleable Iron Threaded	
Number	4
Reducer Coupling, 19.1 x 12.7 mm (3/4 x 1/2 in), Malleable Iron Threaded	
Number	4
Bushing, 19.1 x 12.7 mm (3/4 x 1/2 in), Bronze	
Number	8
Cross, 12.7 mm (1/2 in), Malleable Iron Threaded	
Number	2
Tee, 12.7 mm (1/2 in), Malleable Iron Threaded	
Number	4

Parameter	Value
Cap, 12.7 mm (1/2 in), Malleable Iron Threaded	
Number	2

PVC Pipe Fittings 580003 (46783-A0)



The PVC Pipe Fittings set contains a large selection of fittings commonly used with PVC pipes.

Specifications

Parameter	Value
Socket-to-Socket, Coupling, 12.7 mm (1/2 in)	
Number	4
Socket-to-Socket, Reducing Bushing, 19.1 x 12.7 mm (3/4 x 1/2 in)	
Number	4
Socket-to-Threaded, Reducing Bushing, 19.1 x 12.7 mm (3/4 x 1/2 in)	
Number	4
Socket, Elbow 90°, 12.7 mm (1/2 in)	
Number	4
Threaded, Elbow 90°, 12.7 mm (1/2 in)	
Number	4
Socket, Elbow 45°, 12.7 mm (1/2 in)	
Number	4
Socket-to-Threaded, Female Adaptor, 12.7 x 12.7 mm (1/2 x 1/2 in)	
Number	4
Threaded, Nipple, 12.7 mm (1/2 in)	
Number	4
Socket-to-Socket, Reducing Coupling, 19.1 x 12.7 mm (3/4 x 1/2 in)	
Number	2

Hose Fittings 580004 (46783-B0)



The Hose Fittings set contains a large selection of fittings commonly used with hoses.

Specifications

Parameter	Value
Hose Barb Tee, 9.53 x 9.53 x 9.53 mm (3/8 x 3/8 x 3/8 in)	
Number	2
Hose Barb Adaptor, 0.375 mm (3/8 in) hose x 12.7 mm (1/2 in) pipe (Male)	
Number	4
Hose Barb Adaptor, 0.375 mm (3/8 in) hose x 12.7 mm (1/2 in) pipe (Female)	
Number	2
Hose Barb Splicer, 9.53 mm (3/8 in)	
Number	5
Hose Barb Elbow 90°, 9.53 mm (3/8 in) hose x 12.7 mm (1/2 in) pipe	
Number	2
Hose Clamp	
Number	10

Tube Fittings 580005 (46783-C0)

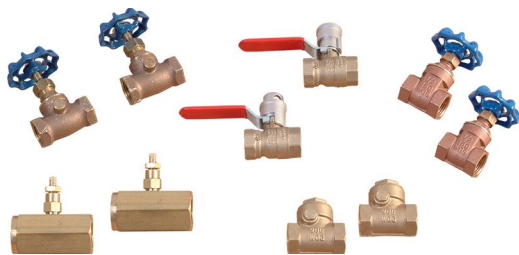


The Tube Fittings set contains a large selection of fittings commonly used with copper tubes.

Specifications

Parameter	Value
Nut, Tube 6.35 mm (1/4 in)	
Number	10
Nut, Tube 9.53 mm (3/8 in)	
Number	10
Tee, Tube 6.35 mm (1/4 in)	
Number	2
Swivel Union, Tube 6.35 mm (1/4 in)	
Number	2
Reducing Union, Tube-to-Tube, 9.53 mm (3/8 in) to 6.35 mm (1/4 in)	
Number	2
Union Coupling, Tube-to-Tube 6.35 mm (1/4 in)	
Number	4
Adaptor, Tube-to-Female Pipe, 9.53 x 12.7 mm (3/8 x 1/2 in)	
Number	2
Adaptor, Tube-to-Female Pipe, 6.35 x 9.53 mm (1/4 x 3/8 in)	
Number	2
Elbow 90°, Tube-to-Female Pipe, 9.53 x 12.7 mm (3/8 x 1/2 in)	
Number	2
Elbow 90°, Tube-to-Tube 6.35 mm (1/4 in)	
Number	2
Elbow 90°, Tube-to-Tube 9.53 mm (3/8 in)	
Number	2
Plug, Tube 9.53 mm (3/8 in)	
Number	2

Valves 580006 (46784-00)



The Valves set contains five types of valves commonly used in the piping industry. This package includes check valve, ball valve, globe valve, needle valve, and gate valve.

Specifications

Parameter	Value
Check Valve	
Number	2
Plug Valve (Ball Valve)	
Number	2
Gate Valve	
Number	2
Needle Valve	
Number	2
Globe Valve	
Quantity	2

Instrumentation Accessories 580007 (46785-00)

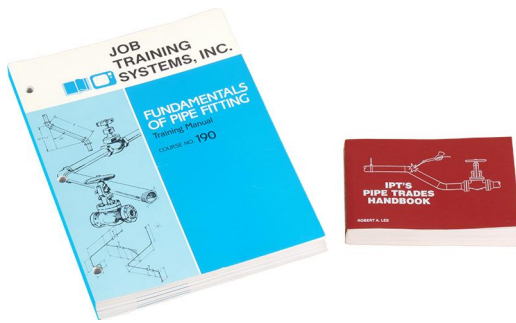


The Instrumentation Accessories set contains the accessories required for pressure measurements. The set includes nipples with pressure measurement port, and plastic tubing.

Specifications

Parameter	Value
Nipple 12.7 mm (1/2 in), with pressure measurement port	
Quantity	4
Length	10.2 cm (4 in)
Tube Cutter	For tubing 6.35-12.7 mm (1/4-1/2 in)
Tubing	
Type	Polyethylene, 6.35 mm (1/4 in) O.D., 4.5 m (180 in) long
Maximum Operating Pressure	700 kPa (100 psi)

Piping Textbooks 580008 (46786-00)



The Piping Textbooks set contains the following reference manuals: Fundamentals of Pipe Fitting, and IPT's Pipe Trades Handbook.

Manual

Description

Manual number

IPT's Pipe Trades (Student Manual) _____ 584854 (39330-00)

Mobile Workstation, Piping 580033 (46801-A0)



The Mobile Workstation is a versatile bench that enables two student groups to operate simultaneously. It is constructed from heavy-duty metal struts and painted using powder-coated paint for durability. The unit is mounted on four swiveling casters with a lock mechanism to ensure easy motion and stable operation, and is sized to pass through standard door openings.

Specifications

Parameter	Value
Physical Characteristics	
Dimensions (H x W x D)	1830 x 1980 x 800 mm (72 x 78 x 31.5 in)
Net Weight	TBE

Optional Equipment Description

Piping Training System (Manuals on CD-ROM) (Optional)
580441 (39162-A0)

List of Manuals

Description	Manual number
Backflow Prevention Devices (Job Sheets - Student) _____	590324 (20640-20)
Backflow Prevention Devices (Job Sheets - Instructor) _____	590325 (20640-30)
Piping Fundamentals (Work Orders - Student) _____	591354 (39162-60)
Piping Fundamentals (Work Orders - Instructor) _____	591356 (39162-70)

Piping Training System (Second Team, Add-On to 46105-0 and -B) (Optional) 580156 (46105-C0)

The Piping Training System (Second Team, Add-On to 46105-0 and -B) is a second team add-on to the Piping Training Systems, Models 46105-0 and 46105-B, that allows two groups of students to work simultaneously on the same workstation.

The Piping Tools, Model 46781, and Piping Accessories, Model 46780, are not supplied with the training system. If two student groups work at the same time on the workstation, they must either use the same tools or perform separate work orders.

List of Manuals

Description	Manual number
Piping Fundamentals (Work Orders - Student) _____	580443 (39162-60)
Piping Fundamentals (Work Orders - Instructor) _____	580445 (39162-70)
IPT's Pipe Trades (Student Manual) _____	584854 (39330-00)

Table of Contents of the Manual(s)

Piping Fundamentals (Work Orders - Student) (580443 (39162-60))

- 1 Installation of Metal Struts on the Mobile Workstation
- 2 Identification of Pipes, Fittings, Valves, and Hangers
- 3 Piping Circuit Layout and Measurement
- 4 Pipe Length Calculation
- 5 Cutting, Reaming, and Threading Steel Pipes
- 6 Identification, Insulation, and Assembly of a Steel Pipe Circuit Using Threaded Fittings
- 7 Assembling a Hose Circuit Using Barb Fittings and Clamps
- 8 Assembling a PVC Pipe Circuit Using Cemented Fittings
- 9 Assembling a Copper Tube Circuit Using Flare Fittings

Specifications

Parameter	Value
Physical Characteristics	
Intended Location	Installed on the workstation of the Piping Training System, Model 46105-0 or Model 46105-B
Dimensions (H x W x D)	TBE
Net Weight	TBE

Piping Consumables (Optional) 583478 (46789-00)



The Piping Consumables set contains all the consumables required by a student, or a student group, to perform the tasks in the student manual. This includes pipes, hoses, tubes, fittings, and tapes.

Specifications

Parameter	Value
Nipple 12.7 mm (1/2 in)	
Number	4
Length	101.6 mm (4 in)
Union - Flange, 12.7 mm (1/2 in), with gasket, bolts and nuts	
Number	2
Union - Ground Joint, 12.7 mm (1/2 in), malleable iron threaded	
Number	1
Nipple 12.7 mm (1/2 in), with pressure measurement port, 4" long	
Number	2
Length	101.6 mm (4 in)
Galvanized steel pipe, 12.7 mm (1/2 in), schedule 40	
Length	12.7 m (500 in)
Elbow 90°, 12.7 mm (1/2 in), malleable iron threaded	
Number	2
Cross, 12.7 mm (1/2 in), malleable iron threaded	
Number	1
Cap, 12.7 mm (1/2 in), malleable iron threaded	
Number	2
Tee, 12.7 mm (1/2 in), malleable iron threaded	
Number	2
Coupling, 12.7 mm (1/2 in), malleable iron threaded	
Number	2
Hose Barb Elbow 90°, 9.53 mm (3/8 in) hose x 12.7 mm (1/2 in) pipe	
Number	1
Hose Barb Adaptor, 9.53 mm (3/8 in) hose x 12.7 mm (1/2 in) pipe	
Number	1
Hose, 9.53 mm (3/8 in) I.D.	
Length	3000 mm (120 in)
PVC Socket-to-Threaded, Female Adaptor, 12.7 mm (1/2 in) x 12.7 mm (1/2 in)	
Number	2
PVC Socket Elbow 90°, 12.7 mm (1/2 in)	
Number	3
PVC Socket Elbow 45°, 12.7 mm (1/2 in)	
Number	2
PVC pipe, Schedule 80, 12.7 mm (1/2 in)	

Parameter	Value
Number	6000 mm (240 in)
Adaptor, tube-to-female pipe, 9.53 x 12.7 mm (3/8 x 1/2" 1/2 in)	
Number	2
Nut, tube 9.53 mm (3/8 in)	
Number	4
Nut, tube 6.35 mm (1/4 in)	
Number	2
Copper Tube, 9.53 mm (3/8 in)	
Length	4500 mm (180 in)
Copper Tube, 6.35 mm (1/4 in)	
Length	3000 mm (120 in)
Reducing Union, tube-to-tube, 9.53 mm (3/8 in) to 6.35 mm (1/4 in)	
Number	2
Thread Seal Tape	
Number	10 rolls, 7600 mm/roll (300 in/roll)

Reflecting the commitment of Festo Didactic to high quality standards in product, design, development, production, installation, and service, our manufacturing and distribution facility has received the ISO 9001 certification.

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