



FESTO

Ford Motor Company

Power Train – Engines



Approved Components List

FESTO

Project Fox – 2009

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Designation	Type	Remarks	Picture	Documentation
1.1 Air Intensifiers DPA	DPA-...	Twin-piston pressure booster Pressure ratio 1:2 Pneumatic connection M7/G1/4, G3/8, G1/2 Input pressure 2 ... 10 bar Output pressure 4 ... 16 bar Flow rate 300 ... 3000 NI/min Ambient temperature +5 ... +60°C		DocuENGB
1.2 Air Drier Refrigeration PDAD	PDAD-...	Use 1.4 Air Drier - Desiccant		DocuENGB
1.3 Air Drier Membrane LDM	LDM1-...	MAXI size Connection G1/2, G3/4, G1 Pressure 3 to 8.5 bar Flow rate 300 to 1000 l/min Reduction in pressure dew point 13 K Threaded connection plates - Without threaded connection plates - With threaded connection plates.		DocuENGB
1.4 & 1.5 Air Drier Desiccant PDAD-...	PDAD-...	Final position dryer for low pressure dew point (-40°C/-70°C) Use as individual device in air supply lines Flow range to 1000 l/min.		DocuENGB
1.6 Air Logic Quicksteppers and Commanders FSS, FSSC	FSS-...	Connection Barbed connector 3 mm Flow 60 l/min Pneumatic/mechanical sequencer Command module for Quickstepper Sequence controller with 12 switching steps Panel mounting.		DocuENGB
1.7 Silencers U-...-B	U-...	Connecting thread G 1/2, G 1/4, G 1/8, G 3/8, G 3/4, G1		DocuENGB




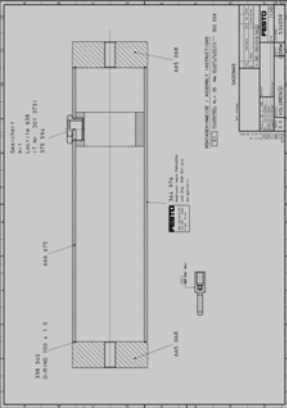





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Designation	Type	Remarks	Picture	Documentation
1.7 Filter Silencers LFU	LFU-...	Connection G3/8,G1/2, G1		DocuENGB
1.8 Air guns LBP, LSP	LSP-...	Air-saving function With lever operation Interchangeable nozzles		DocuENGB
1.9 Rotary distributors GF	GF-...			DocuENGB
2.1 Drip Leg Drain DNC-100-SA203603	DNC-100-SA203603	Drip Leg Drain		
3.1 Lock out valves HE-G	HE-G...-LO	Connection G 3/8, G 1/2, G 3/4, G1 Flow 5 200 ... 12 000 l/min Manually actuated 3/2-way valve, normally closed.		DocuENGB
3.2 Lockout - Combination	DESIGN REVIEW WITH FORD CONTROLS REQ'D FOR ALL APPLICATIONS			



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Designation	Type	Remarks	Picture	Documentation
4.1 Filter – Coalescing LFMA/LFMB-D	Mini, Midi, Maxi	Size MINI, MIDI, MAXI Connection G1/2, G1/4, G1/8, G3/8, G3/4 Pressure 1-16 bar Flow rate up to 950 l/min Down to 0.01µ - 99.9999% Efficiency Condensate drain - Manual Plastic bowl with metal bowl guard		DocuENGB
4.1 Filter – Coalescing MS12	Mini, Midi, Maxi	Size G3/4, G1, G1 1/4, G1 1/2, G2 Pressure 1-12 bar Flow rate up to 7,600 l/min Down to 0.01µ - 99.9999% Efficiency Condensate drain - Manual - Automatic Metal bowl guard		DocuENGB
4.2 Filter LF-D	Mini, Midi, Maxi	Size MINI, MIDI, MAXI Connection G1/2, G1/4, G1/8, G3/8, G3/4 Pressure 2,5 ... 12 bar Flow rate 550 ... 6 000 l/min Condensate drain - Manual - Fully automatic Plastic bowl with metal bowl guard		DocuENGB





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Designation	Type	Remarks	Picture	Documentation
4.2 Filter MS12-LF	MS12-...	Size 12 Connection G1, G1 1/4, G1 1/2, G2 Flow rate to 7600 l/min Grade of filtration 40-5µm Condensate drain - Manual - Fully automatic Metal bowl guard Flow direction - From left to right - From right to left.		DocuENGB
4.3 Filter/Regulator Combination LFR-D	Mini, Midi, Maxi	Size MINI, MIDI, MAXI Connection G1/2, G1/4, G1/8, G3/8, G3/4 Pressure 2,5 ... 12 bar Flow rate 550 ... 6 000 l/min Condensate drain - Manual - Fully automatic Plastic bowl with metal bowl guard Direct proportional lubricator		DocuENGB
IMPORTANT: WHEN USING ON MAINS INCOMING SUPPLY, ALL REGULATORS AND FILTER/ REGULATORS MUST BE FITTED WITH INCREASED FLOW RETURN (OPTION 'I') OR MAXI RANGE				
4.4 Filtration Panels D Series modular and configurable Air Preparation Equipment	Mini, Midi, Maxi	Size MINI, MIDI, MAXI Connection G1/2, G1/4, G1/8, G3/8, G3/4 Pressure 2,5 ... 12 bar Flow rate 550 ... 6 000 l/min Condensate drain - Manual - Fully automatic Plastic bowl with metal bowl guard Direct proportional lubricator		DocuENGB
4.5 Pressure gauges FMA, MA Suitable for Ford 'Visual Factory'	MA-...RG	Connection G 1/8, G 1/4, R 1/8, R 1/4, QS4, QS6, QS8 DIN EN 837-1 Adjustable red-green range.		DocuENGB



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Designation	Type	Remarks	Picture	Documentation
5.1 Regulator Standard, Relieving LR-D	Mini, Midi, Maxi	Size MINI, MIDI, MAXI Connection G1/2, G1/4, G1/8, G3/8, G3/4 Pressure 2,5 ... 12 bar Flow rate 550 ... 6 000 l/min		DocuENGB
		IMPORTANT: WHEN USING ON MAINS INCOMING SUPPLY, ALL REGULATORS AND FILTER/ REGULATORS MUST BE FITTED WITH INCREASED FLOW RETURN (OPTION 'I') OR MAXI RANGE		
5.2 Sandwich Regulators for ISO 15407/2 ISO 5599/2	Various	As appropriate for Directional Valve Range Selected Shall have gauges, where applicable, to conform to Ford FPS System		DocuENGB DocuENGB
5.3 Precision Pressure regulators LRP	LRP-...	Connection G 1/4 Pressure 0,05 ... 7 bar, 0,05 ... 2,5 bar, 0,05 ... 4 bar, 0,1 ... 10 bar Flow 800 ... 2 300 l/min Without pressure gauge.		DocuENGB
5.4 Regulator Reverse Flow Standard, Relieving "I" Option	Midi, Maxi	Size MIDI, MAXI Connection G1/2, G1/4, G1/8, G3/8, G3/4 Pressure 2,5 ... 12 bar Flow rate 550 ... 6 000 l/min		DocuENGB
		IMPORTANT: WHEN USING ON MAINS INCOMING SUPPLY, ALL REGULATORS AND FILTER/ REGULATORS MUST BE FITTED WITH INCREASED FLOW RETURN (OPTION 'I') OR MAXI RANGE		
5.5 Remote Control		NO FESTO SOLUTION		
5.6 Proportional- pressure regulators VPPM	VPPM-...	Connection G1/8, NPT1/8-27 Flow rate 0 ... 1,400 l/min Pressure regulating valves 3 controller positions selectable (rapid, universal, precise) Display optionally available.		DocuENGB





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Designation	Type	Remarks	Picture	Documentation
5.6 Proportional pressure regulators MPPE	MPPE-...	Connection G1/8, G1/4, G1/2 Flow rate 0 ... 8,000 l/min Pressure regulating valves External actual value sensor can be connected Setpoint module available as accessory.		DocuENGB
6.1 Lubricator LOE-D	LOE-D...	Size MICRO, MINI, MIDI, MAXI Connection M5, M7, G 1/4, G 1/8, G 1/2, G 2/4, G 3/8, G1 Pressure 1 ... 16 bar Flow rate 200 ... 9,000 l/min Direct proportional lubricator Plastic bowl with metal bowl guard.		DocuENGB
		DESIGN REVIEW WITH FORD CONTROLS REQ'D FOR ALL APPLICATIONS		
7.1 Soft Start Valve HEL-D	HEL-D...	Size MINI, MIDI, MAXI Connection G 1/4, G 1/2, G 3/4, G 1/8, G 3/8, G1, also available with NPT thread Pressure 3.5 ... 16 bar Flow rate 1,000 ... 6,500 l/min Actuation - Pneumatically actuated 2/2-way valve, normally closed.		DocuENGB
7.2 Quick Dump, solenoid operated HEE-D	HEE-...	Size MINI, MIDI, MAXI Connection G 1/2, G 1/4, G 1/8, G 3/4, G 3/8, G1, also available with NPT thread Pressure 0 ... 16 bar Flow rate 1,000 ... 6,500 l/min Voltage 24 V DC, 110, 230 V AC Actuation - Manually actuated - Electrically actuated - Pneumatically actuated 3/2-way valve, normally closed.		DocuENGB
8.1 Pressure sensors		REFER TO ELECTRICAL DATA FORM 2630		
8.2 Flow rate sensors SFE	SFE1-...	Measurement range of flow rate - 0.5 ... 10 l/min - 10 ... 200 l/min - 200 ... 5 000 l/min - 0 ... 10 V - 4 ... 20 mA Display optimised illuminated LCD diverse assembly options		DocuENGB DocuENGB DocuENGB



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Designation	Type	Remarks	Picture	Documentation
8.3 Proximity Switch		REFER TO ELECTRICAL DATA FORM 2630		
FOR INFORMATION Sensors 8mm (Solid State) SMT, SMTO	SMT-...	Voltage 24 V DC, 230 V AC Cable length 0,3 m Connection plug M12 Electrically - Non-contacting PNP, NPN		DocuENGB DocuENGB
8.4 Linear Position Transducer		REFER TO ELECTRICAL DATA FORM 2630		
8.5 Part Present Sensor SOPA	SOPA-....	+/- 2.5 µm sensing range 30 µm to 150 µm; +/- 5 µm sensing range 20 µm to 200 µm; Under constant operating conditions (temperature and supply pressure) and sensor nozzle nominal diameter (2 mm) Operating pressure 4 - 7 bar Supply pressure 0.8 – 1.6 bar		DocuENGB
9.1 Fieldbus System		REFER TO ELECTRICAL DATA FORM 2630		
10.2 Ball valves Non Vented Non Locking QH, QH-QS	QH-...	Connection G 1/4...G1 1/2 plug connector 4, 6 mm flow (rate) 148 ... 84 000 l/min on-off valve.		DocuENGB
10.4 Non-return valves H, HA, HB	H-...	Connection M5, G 1/8, G 1/4, G 3/8, G 1/2, G 3/4 Push-in connector 4, 6, 8, 10, 12 mm Flow 140 ... 5 500 l/min Shut-off valve.		DocuENGB



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10.5 Valve terminals type 44 VTSA ISO 15407-2, ISO 5599/2 with CPX Electrics	VTSA-... with CPX	Flow (rate) 550 ...2,200 l/min width 18, 26, ISO 1 & 2 (ISO 5599/2) 2 ... 32 valve multi-pole connection Fieldbus Channel-oriented diagnosis CPX electrical terminal.		DocuENGB DocuENGB
		PREFERRED RANGE		
10.6 Standard valves VSVA ISO 15407-1 (VDMA 24 563)	VSVA-...	Connection G1/8, ISO 02; G1/4, ISO 01 Flow 500 ... 1 000 l/min Voltage 12, 24 V DC, 24, 110, 230 V AC Sub-base valve - Electrically actuated, piloted - Pneumatically actuated Manifold sub-bases.		DocuENGB
		SPECIFY SEPARATE COILS TYPE ... 1C1 with M12 CONNECTORS TYPE MSSD-EB-M12-MONO #188024		
10.7 Valve terminals type 04B ISO 5599/2	VIFB-...	Flow rates: 1200 to 4500 l/min Sizes: ISO 1, 2 and 3 1 to 16 standard valves 1 to 12 I/O modules Multi-pin connection Fieldbus connection.		DocuENGB
10.8 Standard valves MDH/JMDH ISO 5599-1	MDH- ... JMDH-...	Connection G1/2, ISO1; G3/8, ISO2; G1/2, ISO3; G3/4, ISO4 Flow 1 200 ... 6 000 l/min Voltage Sub-base valve - Electrically actuated, piloted - Pneumatically actuated		DocuENGB
		SPECIFY SEPARATE COILS with M12 CONNECTIONS		
10.9 Hand lever valves VHER	VHER-...	Connection M5, G1/8, G1/4, G1/2, also available with NPT thread Flow rate 100 ... 3,500 l/min		DocuENGB



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Designation	Type	Remarks	Picture	Documentation
10.10 Tiger Range Valves CPE	MFH-... MVH-... JMFH-... JMVH-... VL-... J-... CPE-... +solenoid valves	Connection G1/8, G1/4, G3/8 Flow 750 ... 2 600 l/min Voltage 12, 24, 42, 48 V DC, 24, 42, 48, 110, 230, 240 V AC In-line valve - Electrically actuated, piloted - Pneumatically actuated Manifold rail (PRS) Manifold strips.		DocuENGB
		NON-PREFERRED RANGE		
10.10 Compact performance CPE valves	CPE14-...	Connection M5, M7, G 1/8, G 1/4, G 3/8 Push-in connector 4, 6, 8, 10, 12 mm Flow 180 ... 3 200 l/min Voltage 24 V DC, 110, 230 V AC In-line valves - Electrically actuated, piloted, pneumatic spring return Manifold rail.		DocuENGB
		NON-PREFERRED RANGE		
10.11 Quick exhaust valves SE, SEU	SE-...	Connection G 1/8, G 1/4, G 3/8, G 1/2. G 3/4 Flow 300 ... 6 480 l/min Shut-off valve.		DocuENGB
10.12 OR gates, AND gates OS, ZK	OS-...	Flow rates: 120 to 5000 l/min Barbed fittings for 3 mm tubing G 1/8, G 1/4 , G 1/2 OR function AND function		DocuENGB
10.13 Manifolds for mounting Valves	MDH/JMDH-... VIFB- ... MN2H/ JMN2H-... VTSA	Sub-bases Manifold sub-bases Throttle plates Intermediate pressure regulator plates		DocuENGB DocuENGB DocuENGB DocuENGB



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10.14 CPX electrical terminal	Various	Operating mode - Stand-alone - with valve terminal type 44 VTSA Input/output modules Digital Analogue		DocuENGB DocuENGB DocuENGB DocuENGB
10.15 Ball valve drive units VZPR	VZPR-...	Connection Rp 1/4, Rp 3/8, Rp 1/2, Rp 3/4, Rp1, Rp1 1/4, Rp1 1/2, Rp2, Rp2 1/2 flow (rate) 100 ... 8 900 l/min ball valve with drive port pattern to Namur VDI/VDE 3845 corrosion and acid resistant versions.		DocuENGB
11.1 Standard cylinders DSNU DIN ISO 6432	DSNU-...	Diameter 8...25 mm Stroke length 1 ... 295 mm Force 30 ... 1870 N Position sensing Fixed or adjustable cushioning		DocuENGB
		FOR PNEUMATIC LOCKS – USE ‘KP’ OPTION FOR END LOCKS – USE ‘EL’ OPTION		
11.2 Standard cylinder DNCB ISO 15552	DNCB-...	Diameter 32, 40, 50, 63, 80, 100 mm Stroke length 2 ... 2 000 mm Force 483 ... 4,712 N Position sensing Adjustable cushioning Male thread.		DocuENGB
11.2 Standard cylinder DNC ISO 15552	DNC-...	Diameter 32, 40, 50, 63, 80, 100, 125 mm Stroke length 10 ... 2 000 mm Force 483 ... 7 363 N Position sensing		DocuENGB
		FOR PNEUMATIC LOCKS – ACTIVE USE ‘DNCKE’ OPTION PASSIVE USE ‘KP’ OPTION FOR END LOCKS – USE ‘EL’ OPTION		





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Designation	Type	Remarks	Picture	Documentation
<p>11.2</p> <p>Standard cylinder</p> <p>DNG, DNGZK</p> <p>VDMA 24652, ISO 6431, NF E49 003.1, UNI 10290</p>	DNG-... DNGZK-...	<p>Diameters 125, 160, 200, 250, 320 mm</p> <p>Stroke length 10 to 2,000 mm</p> <p>Force up to 48,250 N</p> <p>Position sensing</p> <p>Adjustable cushioning</p> <p>Male thread</p> <p>Trunnion flange.</p>		DocuENGB
<p>11.3</p> <p>Standard cylinders</p> <p>ADN, AEN</p> <p>ISO 21287</p>	ADN-...	<p>Diameter 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125 mm</p> <p>Stroke length 1 ... 500 mm</p> <p>Force 68 ... 7 363 N</p> <p>Position sensing</p>		DocuENGB
		<p>FOR PNEUMATIC LOCKS – USE 'KP' OPTION</p> <p>FOR END LOCKS – USE 'EL' OPTION</p>		
<p>11.4</p> <p>Angle Gripper Mechanisms</p> <p>HGW</p>	HGW-...	<p>Size 10, 16, 25, 32, 40 mm</p> <p>Opening angle 40°</p> <p>Total gripping torque 12 ... 965 Ncm</p> <p>Position sensing.</p>		DocuENGB
<p>11.4</p> <p>Three-point gripper</p> <p>HGD</p>	HGD-...	<p>Size 16, 32, 50 mm</p> <p>Stroke length 2.5 to 6 mm per gripper jaw</p> <p>Force 30 to 323 N per gripper jaw</p> <p>Position sensing.</p>		DocuENGB
<p>11.4</p> <p>Parallel gripper</p> <p>HGPT</p>	HGPT-...	<p>Size 16, 20, 25, 35, 40, 50, 63 mm</p> <p>Stroke length 3 to 16 mm per gripper jaw</p> <p>Force 36 to 825 N per gripper jaw</p> <p>Position sensing</p> <p>Sealing air connection.</p>		DocuENGB
<p>11.4</p> <p>Parallel gripper</p> <p>HGPC</p>	HGPC-...	<p>Size 12, 16, 20 mm</p> <p>Stroke length 3 to 7 mm per gripper jaw</p> <p>Force 22 to 63 N per gripper jaw</p> <p>Position sensing.</p>		DocuENGB



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<p>11.4</p> <p>Parallel gripper</p> <p>HGPL</p>	HGPL-...	<p>Size 14, 25, 40 mm</p> <p>Stroke length 40 to 80 mm per gripper jaw</p> <p>Force 60 to 605 N per gripper jaw</p> <p>Position sensing.</p>		DocuENGB
<p>11.4</p> <p>Parallel gripper</p> <p>HGPP</p>	HGPP-...	<p>Size 10, 12, 16, 20, 25, 32 mm</p> <p>Stroke length 2 to 12.5 mm per gripper jaw</p> <p>Force 40 to 415 N per gripper jaw</p> <p>Position sensing.</p>		DocuENGB
<p>11.4</p> <p>Parallel gripper</p> <p>HGPPI</p>	HGPPI-...	<p>Size 12 mm</p> <p>Stroke length 0 to 10 mm per gripper jaw</p> <p>Force 10 to 60 N per gripper jaw</p> <p>Position sensing.</p>		DocuENGB
<p>11.4</p> <p>Parallel gripper</p> <p>HGP</p>	HGP-...	<p>Size 6, 10, 16, 20, 25, 35 mm</p> <p>Stroke length 2 to 12.5 mm per gripper jaw</p> <p>Force 10 to 375 N per gripper jaw</p> <p>Position sensing.</p>		DocuENGB
<p>11.4</p> <p>Parallel gripper</p> <p>HGPM</p>	HGPM-...	<p>Size 8, 12 mm</p> <p>Stroke length 2, 3 mm</p> <p>Force 16.5 ... 30 N</p> <p>Gripper jaw open</p> <p>Gripper jaw closed.</p>		DocuENGB
<p>11.4</p> <p>Three-point gripper</p> <p>HGDT</p>	HGDT-...	<p>Size 25, 35, 40, 50, 63 mm</p> <p>Stroke length 3 to 10 mm per gripper jaw</p> <p>Force 69 to 576 N per gripper jaw</p> <p>Position sensing.</p>		DocuENGB



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<p>11.4</p> <p>Radial gripper</p> <p>HGR</p>	HGR-...	<p>Size 10, 16, 25, 32, 40 mm</p> <p>Opening Angle 180°</p> <p>Force 13 ... 600 Ncm</p> <p>Position sensing.</p>		DocuENGB
<p>11.4</p> <p>Swivel gripper unit</p> <p>HGDS</p>	HGDS-...	<p>Size 12, 16, 20 mm</p> <p>Stroke length 2.5 to 7 mm per gripper jaw</p> <p>Force 26 to 85 N per gripper jaw</p> <p>Position sensing</p> <p>Flexible cushioning rings/plates at both ends</p> <p>Shock absorbers.</p>		DocuENGB
<p>11.5</p> <p>Guided drive units</p> <p>DFM</p>	DFM-...	<p>Diameters 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 mm</p> <p>Stroke length 10 ... 400 mm</p> <p>Force 68... 4,712 N</p> <p>Position sensing</p> <p>Fixed/adjustable cushioning</p> <p>Plain-bearing guide</p> <p>Recirculating ball bearing guide.</p>		DocuENGB
<p>11.6</p> <p>Guide units for standard cylinders</p> <p>FEN</p> <p>ISO 15552</p>	FEN-...	<p>For Diameter 32, 40, 50, 63, 80, 100 mm</p> <p>Stroke length 10 ... 500 mm</p> <p>Plain-bearing guide</p> <p>Recirculating ball bearing guide.</p>		DocuENGB
<p>11.6</p> <p>Guide units for standard cylinders</p> <p>FEN</p> <p>ISO 6432</p>	FEN-...	<p>For Diameter 8, 10, 12, 16, 20, 25 mm</p> <p>Stroke length 1 ... 250 mm</p> <p>Plain-bearing guide</p> <p>Recirculating ball bearing guide.</p>		DocuENGB
<p>11.7</p> <p>Flat cylinder (Non- Rotating)</p> <p>DZF/DZH</p>	<p>DZF-...</p> <p>DZH-...</p>	<p>Diameter 16, 20, 25, 32, 40, 50, 63 mm</p> <p>Stroke length 10 ... 1 000 mm</p> <p>Force 121 ... 1 870 N</p> <p>Position sensing</p> <p>Adjustable cushioning</p> <p>Male thread.</p>		DocuENGB



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Designation	Type	Remarks	Picture	Documentation
11.8 Linear-swivel clamp CLR	CLR-...	Diameter 12, 16, 20, 25, 32, 40, 50, 63 mm Stroke length 10 ... 50 mm Force 51 ... 1 682 N Swivel angle 90° Position sensing Fixed cushioning.		DocuENGB
11.9 Rodless Cylinders (Band Type) DGC, DGP, DGPL	DGC-... DGP-... DGPL-...	Diameters 18, 25, 32, 40, 50, 63, 80 mm Stroke length 10 ... 3,000 mm Force 153... 3,016 N Position sensing Adjustable cushioning		DocuENGB DocuENGB
		MOUNT CYLINDER WITH SEALING BAND DOWNWARDS TO PREVENT INGRESS OF DIRT & LIQUIDS		
11.10 Rodless Cylinders (Magnetically coupled type) DGO	DGO-...	Diameters 12, 16, 20, 25, 32, 40 mm Stroke length 10 to 4,000 mm Force 68 to 754 N Position sensing Adjustable cushioning.		DocuENGB
11.11 & 11.12 Mechanical Rod Locks		REFER TO APPROPRIATE CYLINDER RANGES		
11.13 Clamping units KEC, KPE	KEC-...	For round material 4, 6, 8, 10, 12, 16, 20, 25, 32 mm.		DocuENGB
11.14 Stopper cylinders STA, STAF, DFST	STA-...	Diameter 20, 25, 32, 80 mm Stroke length 10 to 40 mm Position sensing Fixed cushioning.		DocuENGB DocuENGB
11.15 Feed separators HPV	HPV-...	Diameters 10, 14, 22 mm Stroke length 10 to 60 mm Force 47 to 228 N Position sensing.		DocuENGB



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Designation	Type	Remarks	Picture	Documentation
11.16 Standard cylinders with displacement encoder DNCI, DNCM	DNCI-...	Diameters: 32 and 50 mm Stroke lengths: 100, 160, 200, 250, 320, 400 and 500 mm Force: 483, 1 178 N Position sensing - Displacement encoder, internal (DNCI) - Displacement encoder, external (DNCM) - Proximity sensor Fixed cushioning External thread		DocuENGB DocuENGB
11.16 Linear drives with displacement encoder DGCI	DGCI-...	Diameter 18, 25, 32, 40, 63 mm Stroke length 100 ... 2,000 mm Force 153... 1,870 N Max. 5 m/s Repetition accuracy 0.2 ... 0.8 mm.		DocuENGB
11.16 Swivel modules with angular displacement encoder DSMI	DSMI-...	Sizes 25 and 40 mm Swivel angle 0 ... 270 ° Torque 5 ... 20 Nm Position sensing - Rotary encoder integrated - Proximity sensor Fixed cushioning		DocuENGB
11.17 Short-stroke cylinders ADVC, AEVC	ADVC-...	Diameter 4, 6, 10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100 mm Stroke length 2,5 ... 25 mm Force 7,5 ... 4 712 N Position sensing Fixed cushioning		DocuENGB
12.1 Semi-rotary drives DRQD	DRQD-... DRQ-...	Size 6, 8, 12, 16, 20, 25, 32, 40, 50 mm Torque 0.16 ... 50 Nm Swivel angle 0 ... 360° Position sensing Adjustable cushioning System product for handling and assembly technology.		DocuENGB
12.2 Swivel modules DSM, DSR	DSM-... DSR-...	Size 6, 8, 10, 12, 16, 25, 32, 40 mm Torque 0.15 ... 20 Nm Swivel angle 0 ... 270° Position sensing Fixed cushioning.		DocuENGB DocuENGB



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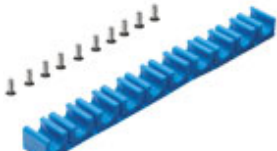
Designation	Type	Remarks	Picture	Documentation
12.3 Air Motor		NO FESTO SOLUTION		
13.1 In-line Flow Control (exhaust control) GR	GR-... GRO-...	Connection M5, G 1/8, G 1/4 Push-in connector 3, 4, 6 mm Flow 0 ... 350 l/min Flow control valve.		DocuENGB
13.2 Flow Control with threaded connection (cylinder mounted) GRLA	GRLA-... GRLZ-...	Connection M5, G 1/8, G 1/4, G 3/8, G 1/2, G 3/4, also available with NPT thread Flow rate 0 ... 4,320 l/min Non-return and flow control valve.		DocuENGB
13.3 Flow Control Sandwich Plate	GRO-...			DocuENGB DocuENGB DocuENGB
14.1 Shock absorbers YSR, YSRW, DYSW, DYEF, DYSC, YDR	YSR-...	Size 4, 5, 7, 8, 10, 12, 16, 20, 25, 32 mm Stroke length 4 to 60 mm 0.6 to 380 J per stroke Adjustable cushioning Self-adjusting cushioning Progressive cushioning		DocuENGB
15.1 Low Pressure Hose		NO FESTO SOLUTION		
15.2 High Pressure Hose		NO FESTO SOLUTION		
16.1 Tubing for compressed air networks PQ-AL	PQ-AL...	Diameter 12, 15, 18, 22, 28 mm Aluminium pipe.		DocuENGB



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Designation	Type	Remarks	Picture	Documentation
16.2 Plastic Tubing PUN <div style="border: 1px solid red; padding: 2px; display: inline-block; margin-left: 20px;">BLUE COLOUR</div>	PUN-...BL	Diameters 3, 4, 6, 8, 10, 12, 16 mm Standard O.D. tubing Operating medium - Compressed air - Vacuum - Water - Polyurethane		DocuENGB
16.3 Push-in fittings for compressed air networks (SEE 16.2) CQ	CQ-...	Connection G 3/8, G 1/2, G 3/4, G1 Diameter 12, 15, 18, 22, 28 mm Threaded connection - G thread with sealing ring Push-in fitting Push-in connectors Push-in sleeves Blanking plugs.		DocuENGB
16.4 Quick Star push-in fittings, standard series QS	QS-...	Connection R 1/8, R 1/4, R 1/2, R 3/8, G 1/8, G 1/4, G 1/2, G 3/8 diameter 4, 6, 8, 10, 12, 16 mm cartridge size 10, 14, 17, 18 screw connection - G thread with sealing ring - R thread PTFE-coated push-in fittings suitable for a vacuum push-in fittings		DocuENGB
16.4 <div style="color: green; font-size: 2em; margin-left: 100px;">↓</div> Quick Star push-in fittings Temperature Range up to 150°C QS-F	QS-F-...	Connection M5, M7, G 1/8, G 1/4, G 3/8, G 1/2 diameter 4, 6, 8, 10, 12 mm screw connection - metric thread with a sealing ring - G thread with sealing ring suitable for vacuum push in fittings		DocuENGB
16.5 Tubing Swivels		NO FESTO SOLUTION		
16.6 Steel Tubing		NO FESTO SOLUTION		
16.7 Steel Tubing-Fittings		NO FESTO SOLUTION		
16.8 Tubing accessories KK	KK-...	Clear and orderly tubing layout Materials - Polyamide - Polyethylene.		DocuENGB



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Designation	Type	Remarks	Picture	Documentation
16.9 Tubing Swivels		NO FESTO SOLUTION		
16.10 Diagnostic Test Point Equipment		NO FESTO SOLUTION		
17.1 Quick coupling plugs & sockets KD, KS	KD-...	Connection M3, M5, G 1/8, G 1/4, G 3/8, G 1/2 Diameter 2, 3, 4, 6, 9, 13 mm Threaded connection - Metric thread with sealing ring - G thread with sealing ring Shut-off on one side Shut-off on both sides Safety coupling to ISO 4414.		DocuENGB
18.1 Vacuum generators VAD, VAK	VAK-... VAD-...	Nominal size 0,5 ... 1,5 mm Connection M5, G 1/8, G 1/4, G 3/8.		DocuENGB
18.1 Vacuum generators VN	VN-...	Nominal size 0.45 to 3 mm Connection -Plug connector QS4, QS6, QS8, QS10, QS12 -Thread M5, G1/8, G1/4, G3/8 -Push-in sleeve 4.6 mm Standard -Vacuum port 90° to supply port Inline -Vacuum port in line with supply port Ejector pulse valve, pneumatic.		DocuENGB
18.2 Vacuum generators VADM, VADMI	VADM-...	Nominal size 0,45 ... 3,0 mm Connection M5, G 1/8, G 1/4, G 3/8 Solenoid valve, vacuum ON/OFF Solenoid valve, ejector pulse Integrated silencer Integrated filter with contamination indicator.		DocuENGB
18.3 Vacuum security valves ISV	ISV-...	Connection Maintenance of the vacuum when using several suction cups and one fails.		DocuENGB







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Designation	Type	Remarks	Picture	Documentation
18.4 Suction cups ESS	ESS-... ESG-... VAG-...	Suction cup size diameter 2 to 200 mm, 4x10 to 30x90 mm Connection - Male thread, Female thread Round suction cup - Standard - Extra deep suction cup - Bellows, 1.5-fold - Bellows, 3.5-fold - Bell-shaped Oval suction cup.		DocuENGB
18.5 Vacuum Flow Sensing		NO FESTO SOLUTION		
18.6 Vacuum Cylinders		NO FESTO SOLUTION		
18.7 Vacuum Transfer System		NO FESTO SOLUTION		
18.8 Vacuum Tubing & Fittings		CONSIDER FESTO STANDARD TUBING & FITTINGS		
19.1 Air reservoirs CRVZS, VZS	CRVZS-...	Connecting thread Volume 0.1; 0.4; 0.75; 2; 5; 10; 20 l		DocuENGB
20.1 Air Prep Units with Maintenance Lock		DISCUSS WITH FORD CONTROLS ENGINEERING		
20.2 Air Prep Units with NO Maintenance Lock		DISCUSS WITH FORD CONTROLS ENGINEERING		



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Designation	Type	Remarks	Picture	Documentation
21.1 Control block for two-hand start ZSB	ZSB-...	Connection G 1/8 Flow 50 l/min Two-hand actuation.		DocuENGB
21.2 Non-return valves, piloted HGL	HGL-...-B H-...	Connection M5, G 1/8, G 1/4, G 3/8, G 1/2 Flow 108 ... 1 540 l/min Shut-off valve - Pneumatic piloted non-return valve.		DocuENGB
DESIGN REVIEW WITH FORD CONTROLS REQ'D FOR ALL APPLICATIONS				
21.2 Pneumatic 2 way valves VL/O VLX	VL/O-... VLX-...	Connections G1/4 to G 1, Flow rate 2,400 to 14,000 l/min Pneumatically actuated		
DESIGN REVIEW WITH FORD CONTROLS REQ'D FOR ALL APPLICATIONS				
21.3 Push button operated valves SV	L-... SV-3-... SV-5-...	Connection M5 Flow 80l/min		DocuENGB
21.3 Push button operated actuators	PR,T,P, N, H, PRS, Q-...	22mm & 30mm		DocuENGB
21.4 Safety Relief Valves		NO FESTO SOLUTION		



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Designation	Type	Remarks	Picture	Documentation
21.5 Pneumatic timers PZVT	PZVT-...	Connection M5 Flow 50 l/min Time delay 0,2 ... 3 s 2 ... 30 s 8 ... 120 s 20 ... 300 s.		DocuENGB

CHANGE RECORD

Date	Topic	Change	Remarks
28/05/09	10.6 Standard Valves	Range Changed to VSVA	Range changed to ensure availability longevity