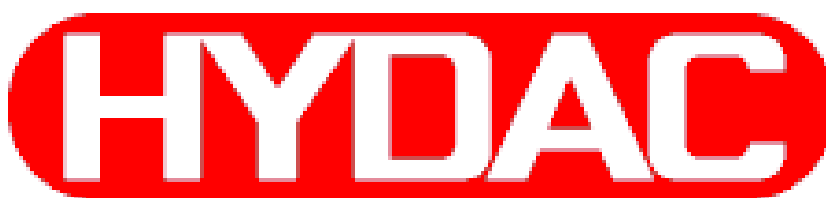




FIAT CHRYSLER AUTOMOBILES

NAFTA POWERTRAIN



HYDAC FLUID POWER PRODUCTS

VERSION 9

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Any questions or comments with respect to this specification should be directed to the project engineer for the specific project in question.

Revision Date	Version No.	Document Name	Revision	Paragraph Affected	Revised By
01-01-2007	2	DCPT-HYDAC	Removed 24 volt series coolers	2.8.1	Steve Schwartz
01-01-2007	2	DCPT-HYDAC	Added larger accumulators and country unit certifications	2.2	Steve Schwartz
05-01-2007	2	DCPT-HYDAC	Updated ENS Temp/Level Model Codes	2.6.4	Steve Schwartz
01-01-2008	4	CPT-HYDAC	Removed reference of Daimler from document Updated HF4R Filter Model Codes Added Off line filtration Update KHB/KHM Ball Valve Model Codes Updated ENS Temp/Level Model Codes Added CS1000 Block Dirt/Water Sensors Added CS1000 Cable	None 2.1.4 2.1.5 2.5.2 2.6.4 2.6.5 2.7.1	Steve Schwartz
07-01-2008	4.1	CPT-HYDAC	Updated Diaphragm Accumulator Model Codes Updated Ball Valve Model Codes Added CX & CXK Valves Added Cartridge Valves – Screw In Updated Contact List	2.2.2 2.5.2 2.5.3, 2.5.4 2.5.5 3.0, 4.0	Steve Schwartz
01-01-2009	5	CPT-HYDAC	Added DIN 24550 Filters Added KHNVS Low Pressure Ball Valves Added CX**M Series Coaxial Valves Added CETOP Directional Control Valves	2.1.5, 6 & 7 2.5.3 2.5.5 2.5.8	Steve Schwartz
07-01-2009	5.1	CPT-HYDAC	Added BP, BL, BLT & BD Series Breathers	2.5.9	Steve Schwartz
01-01-2010	6	CPT-HYDAC	Added EDS8000 Pressure Switch Added Swivel Adapter for EDS8000	2.6.2 2.7.2.4	Steve Schwartz
01-01-2012	6.1	CPT-HYDAC	Added RF7 Option for Backflush Filters Changed Bladder Accumulators from Top Repairable to Bottom Repairable Added Mounting Accessories to CX**M Valves	2.1.9 2.2.1 2.5.5	Steve Schwartz
07-01-2012	7	CPT-HYDAC	Updated Model Codes for HF4R Filters Change Model to CXK02 (Closing against flow) Removed CX03M and CX05M Models	2.1.4 2.5.4 2.5.5	Steve Schwartz
07-01-2013	8	CPT-HYDAC	Added Ball Valves LP Pneumatically Operated Added 2/2 Way Piston Valve Blocks Added 2/2 Way Piston Valve Stacks Added Pressure Relief Valve - Seat Type Added Pressure Booster Unit (PBU Series)	2.5.4 2.5.5 2.5.6 2.5.9 2.9.1	Steve Schwartz
01-01-2015	9	FCA-HYDAC	Updated Model Codes – Added 4Bar Note Updated Model Code for correct M12 Connector Added AS3000 Water Sensor Added Hydac Technical Cleanliness Section	2.5.4 2.5.7 2.6.6 3.0	Steve Schwartz

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1.0 INTRODUCTION

1.1 SCOPE OF DOCUMENT

The Program Book provides a list of HYDAC Hydraulic & Lubrication Products for new FCA (NAFTA) Programs. The use of components not listed in the Program Book requires a deviation from FCA (NAFTA) Controls Engineering.

1.2 COMPANY OVERVIEW

HYDAC is a privately owned company with over 40 subsidiaries worldwide providing fluid power solutions to users of mobile and industrial equipment. Our customers count on us to provide world-class hydraulic components and systems. We believe in quality products and service, innovative technology, competitive pricing and customer satisfaction.

Our complete product range includes both hydraulic and process filtration, accumulators, electronic sensors, valves, clamps, accessories, power units, coolers and integrated manifold assemblies that extend our capabilities beyond components and into complete engineered sub-systems.

HYDAC stands for quality and customer satisfaction and is ISO 9001-2000 certified. Highly trained experts, using state of the art equipment, design our products. Continuous research and development keep HYDAC poised as a leader in the industry. Along with exceptional design, HYDAC uses the most modern production methods to ensure quality.

2.0 PRODUCT OVERVIEW

The HYDAC components, which are recommended for FCA (NAFTA) Programs, are listed on the following pages. For additional information on HYDAC components, please see the Websites listed below.

HYDAC USA Products: <http://www.hydacusa.com/>

HYDAC GERMANY Products: <http://www.hydac.com/>

2.1 FILTERS

2.1.1 High Pressure – Base Mount HF4P Series - 5000 PSI

Model Code	Max. Rec. Flow	Bypass Pressure	Port Size
HF4P-BN-09G**LZ1.1/0B3-BO	50 GPM	43 PSID (3 Bar)	G 1-1/2"
HF4P-BN-18G**LZ1.1/0B3-BO	100 GPM	43 PSID (3 Bar)	G 1-1/2"
HF4P-BN-27G**LZ1.1/0B3-BO	120 GPM	43 PSID (3 Bar)	G 1-1/2"
HF4P-BH-09G**LZ1.1/0-A2-BO	50 GPM	Non-Bypass	G 1-1/2"
HF4P-BH-18G**LZ1.1/0-A2-BO	100 GPM	Non-Bypass	G 1-1/2"
HF4P-BH-27G**LZ1.1/0-A2-BO	120 GPM	Non-Bypass	G 1-1/2"



2.1.2 High Pressure – Line Mount HF3P Series - 6000 PSI

Model Code	Max. Rec. Flow	Bypass Pressure	Port Size
HF3P-BN-08G**LZ1.1/0B3-BO	55 GPM	43 PSID (3 Bar)	G 1-1/2"
HF3P-BH-08G**LZ1.1/0-A2-BO	55 GPM	Non-Bypass	G 1-1/2"



2.1.3 High Pressure – Line Mount HF2P Series – 4000 PSI

Model Code	Max. Rec. Flow	Bypass Pressure	Port Size
HF2P-BN-08G**LZ1.2/0B3-BO	25 GPM	43 PSID (3 Bar)	G 3/4"
HF2P-BH-08G**LZ1.2/0-A2-BO	25 GPM	Non-Bypass	G 3/4"



2.1.4 Low Pressure – Intank Return – HF4R Series – 100 PSI

Model Code	Max. Rec. Flow	Bypass Pressure	Inlet Port Size
HF4R-BN-09G**LZ2.2/0B2.7-BO-T	50 GPM	40 PSID (2.7 Bar)	G 1-1/2"
HF4R-BN-18G**LZ2.2/0B2.7-BO-T	75 GPM	40 PSID (2.7 Bar)	G 1-1/2"
HF4R-BN-27G**LZ2.2/0B2.7-BO-T	100 GPM	40 PSID (2.7 Bar)	G 1-1/2"



2.1.5 High Pressure – DFN Series - (DIN 25540)

Model Code	Rec. Flow	Bypass Pressure	Max. Pressure	Port Size
DFN BN/HC 100 S D ** LZ 1.0/-B7-BO	100 LPM	7 Bar	400 Bar	G 1"
DFN BN/HC 250 S F ** LZ 1.0/-B7-BO	250 LPM	7 Bar	400 Bar	G 1-1/2"
DFN BN/HC 400 L F ** LZ 1.0/-B7-BO	400 LPM	7 Bar	210 Bar	G 1-1/2"
DFN BH/HC 100 S D ** LZ 1.0/-BO	100 LPM	Non-Bypass	400 Bar	G 1"
DFN BH/HC 250 S F ** LZ 1.0/-BO	250 LPM	Non-Bypass	400 Bar	G 1-1/2"
DFN BH/HC 400 L F ** LZ 1.0/-BO	400 LPM	Non-Bypass	210 Bar	G 1-1/2"



2.1.6 Low Pressure – LFN Series - (DIN 25540)

Model Code	Rec. Flow	Bypass Pressure	Max. Pressure	Port Size
LFN BN/HC 40 I B ** LZ 2.0/-B7-BO	40 LPM	7 Bar	100 Bar	G 1/2"
LFN BN/HC 63 I C ** LZ 2.0/-B7-BO	63 LPM	7 Bar	100 Bar	G 3/4"
LFN BN/HC 100 I D ** LZ 2.0/-B7-BO	100 LPM	7 Bar	100 Bar	G 1"
LFN BH/HC 40 I B ** LZ 2.0/-BO	40 LPM	Non-Bypass	100 Bar	G 1/2"
LFN BH/HC 63 I C ** LZ 2.0/-BO	63 LPM	Non-Bypass	100 Bar	G 3/4"
LFN BH/HC 100 I D ** LZ 2.0/-BO	100 LPM	Non-Bypass	100 Bar	G 1"



2.1.7 Low Pressure – RFN Series, In-Tank Return - (DIN 25540) 10 Bar Max.

Model Code	Rec. Flow	Bypass Pressure	Inlet Port Size
RFN BN4HC 40 B D ** LZ 1.0/-BO	40 LPM	3.5 Bar	G 1"
RFN BN4HC 63 B D ** LZ 1.0/-BO	60 LPM	3.5 Bar	G 1"
RFN BN4HC 100 B D ** LZ 1.0/-BO	100 LPM	3.5 Bar	G 1"
RFN BN4HC 250 B F ** LZ 1.0/-BO	250 LPM	3.5 Bar	G 1-1/2"
RFN BN4HC 400 B F ** LZ 1.0/-BO	400 LPM	3.5 Bar	G 1-1/2"



2.1.8 Off-Line Filters (OLF Series)

"Please Contact HYDAC with Application Data for Sizing"



2.1.9 Filters for Coolant/Washing Machines – (RF3, RF4, RF7, FLND, PLF1, PBF, PRFS)

"Please Contact HYDAC with Application Data for Sizing"



RF3



RF4



RF7



FLND



PLF1



PBF



PRFS

2.2 ACCUMULATORS

2.2.1 Bladder – Bottom Repairable (SB Series)

Model Code	Volume L (Gal.)	Pressure Bar (PSI)	Max. Flow LPM (GPM)	Port Size
SB330-10A1/112 <u>S</u> -210A	10 (2.5)	210 (3000)	912 (240)	G – 2"
SB330-20A1/112 <u>S</u> -210A	20 (5)	210 (3000)	912 (240)	G – 2"
SB330-32A1/112 <u>S</u> -210A	32 (10)	210 (3000)	912 (240)	G – 2"
SB330-54A1/112 <u>S</u> -210A	54 (15)	210 (3000)	912 (240)	G – 2"
SB600-20A1/112 <u>S</u> -345A	20 (5)	345 (5000)	912 (240)	G – 2"
SB600-32A1/112 <u>S</u> -345A	32 (10)	345 (5000)	912 (240)	G – 2"
SB600-54A1/112 <u>S</u> -345A	54 (15)	345 (5000)	912 (240)	G – 2"



2.2.2 Diaphragm – Welded (SBO Series) Note: * = K or B Port. Both are ISO 228

Model Code	Volume L (CI)	Pressure Bar (PSI)	Max. Flow LPM (GPM)	Port Size
SBO250-0.075E4/112 <u>S</u> -250AK	0.075 (5)	250 (3600)	38 (10)	G – 1/2"
SBO210-0.16E4/112 <u>S</u> -210AK	0.16 (10)	210 (3000)	38 (10)	G – 1/2"
SBO210-0.32E4/112 <u>S</u> -210AK	0.32 (20)	210 (3000)	95 (25)	G – 1/2"
SBO210-0.5E4/112 <u>S</u> -210AK	0.5 (30)	210 (3000)	95 (25)	G – 1/2"
SBO210-0.75E4/112 <u>S</u> -210A*	0.75 (45)	210 (3000)	95 (25)	G – 1/2"
SBO200-1E4/112 <u>S</u> -210A*	1 (60)	210 (3000)	95 (25)	G – 1/2"
SBO210-1.4E4/112 <u>S</u> -210A*	1.4 (85)	210 (3000)	95 (25)	G – 1/2"
SBO210-2E4/112 <u>S</u> -210A*	2 (120)	210 (3000)	152 (40)	G – 3/4"
SBO210-2.8E4/112 <u>S</u> -210A*	2.8 (170)	210 (3000)	152 (40)	G – 3/4"
SBO250-3.5E4/112 <u>S</u> -210A*	3.5 (230)	210 (3000)	152 (40)	G – 3/4"



Welded

PLEASE NOTE: IF ACCUMULATOR FINAL DESTINATION IS SOME PLACE OTHER THAN USA, THE “S” IN THE MODEL CODE NEEDS TO CHANGE TO ONE OF THE FOLLOWING ORDER CODES:

A4 = POLAND
A6 = RUSSIA
A8 = SLOVAKIA
A9 = CHINA

E = PUERTO RICO; COSTA RICA; BAHAMAS

F = AUSTRALIA

P = JAPAN

S1 = CANADA

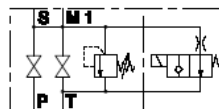
T = NEW ZEALAND

U = ALL OTHER COUNTRIES

2.3 ACCUMULATOR SAFETY BLOCKS

Note: The following Safety Blocks Include:

- 1 – Manual Shut Off Valve w/Locking Mechanism
- 1 – Manual Bleed Valve
- 1 – 24VDC N.O. 2-Way Solenoid Bleed Valve
- 1 – Adjustable Pressure Relief Valve (DB12)



Sizes: SAF 10 E
SAF 20 E
SAF 32 E

Connections

S – Accumulator Connection
P – System Connection
T – Tank Connection
M1 – Gauge Connection

Model Code	Shut Off Valve Size	Pressure Adjustment Bar (PSI)	Pressure Maximum Bar (PSI)	S - Port Size
SAF10E16Y1N250AS10L	DN10	250 (3625)	400 (5800)	G – 3/4"
SAF10E16Y1N350AS10L	DN10	350 (5075)	350 (5075)	G – 3/4"
SAF20E16Y1N250AS12L	DN20	250 (3625)	250 (3625)	G – 1 1/4"
SAF20E16Y1N350AS12L	DN20	350 (5075)	350 (5075)	G – 1 1/4"
SAF20E16Y1N250AS13L	DN20	250 (3625)	250 (3625)	G – 2"
SAF20E16Y1N350AS13L	DN20	350 (5075)	350 (5075)	G – 2"
SAF32E16Y1N250AS309L	DN32	250 (3625)	250 (3625)	G – 2"
SAF32E16Y1N350AS309L	DN32	350 (5075)	350 (5075)	G – 2"



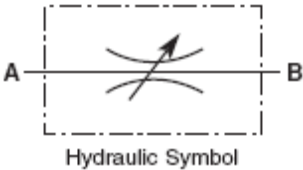
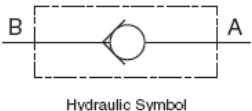
2.4 ACCUMULATOR ACCESSORIES

Description	Model Code	For Use With the Following Accumulators	
2.4.1 Permanent Gauging Blocks	PERMGAUGINGBLOCK TR VER4 - ****	SB***TR Series	
	PERMGAUGINGBLOCK VER4 - ****	SBO Series	
2.4.2 Charging & Gauging Kit	FPK 400 F 4.0 – G4 – K	SB/SBO Series	
Adaptor for Charging & Gauging Kit	FPK/SB	SB***TR Series	
2.4.3 Mounting Clamp	HYRAC 62-65 ST	SBO250 0.075 Liter	
	HYRAC 73-76 ST	SBO210 0.16 Liter	
	HYRAC 89-92 ST	SBO210 0.32 Liter	
	HYRAC 100-105 ST	SBO210 0.5 Liter	
	HYRAC 133-142 ST	SBO200 1 Liter	
	HSS 222/229	SB330/600 10 to 54 Liter	
	KBK 222/G	SB330/600 10 to 54 Liter	

2.5 VALVES & ACCESSORIES



2.5.1 Inline Flow Control & Check Valves - 5000 PSI

Model Code	Port Size	Description
DV-06-01.X/0	G – 1/8"	  Hydraulic Symbol
DV-08-01.X/0	G – 1/4"	
DV-10-01.X/0	G – 3/8"	
DV-12-01.X/0	G – 1/2"	
DV-16-01.X/0	G – 3/4"	
DV-20-01.X/0	G – 1"	
DV-25-01.X/0	G – 1 1/4"	
DV-30-01.X/0	G – 1 1/2"	  Hydraulic Symbol
DRV-06-01.X/0	G – 1/8"	
DRV-08-01.X/0	G – 1/4"	
DRV-10-01.X/0	G – 3/8"	
DRV-12-01.X/0	G – 1/2"	
DRV-16-01.X/0	G – 3/4"	
DRV-20-01.X/0	G – 1"	
DRV-25-01.X/0	G – 1 1/4"	  Hydraulic Symbol
RV-06-01.X/0	G – 1/8"	
RV-08-01.X/0	G – 1/4"	
RV-10-01.X/0	G – 3/8"	
RV-12-01.X/0	G – 1/2"	
RV-16-01.X/0	G – 3/4"	
RV-20-01.X/0	G – 1"	
RV-25-01.X/0	G – 1 1/4"	
RV-30-01.X/0	G – 1 1/2"	
RV-40-01.X/0	G – 2"	

Needle Valve, Carbon Steel with Viton Seals.
Graduated knob and color-coded spindle.

Flow Control Valve, Carbon Steel with Viton Seals.
Graduated knob and color-coded spindle.
0.5 Bar (7 PSI) Reverse Flow Check Valve.

Check Valve, Carbon Steel with Viton Seals.
0.5 Bar (7 PSI) Cracking Pressure Standard.



2.5.2 Ball Valves – High Pressure with Locking Device

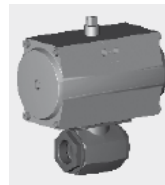
Note: ** In Model Code Designates Optional Handles

Model Code	Port Size	Max. Pressure Bar (PSI)	Description
KHB-G1/8-1114-**X-SO760	G – 1/8"	500 (7250)	 KHB Block Housing
KHB-G1/4-1114-**X-SO760	G – 1/4"	500 (7250)	
KHB-G3/8-1114-**X-SO760	G – 3/8"	500 (7250)	
KHB-G1/2-1114-**X-SO760	G – 1/2"	400 (5800)	
KHB-G3/4-1114-**X-SO760	G – 3/4"	315 (4570)	
KHB-G1-1114-**X-SO760	G – 1"	315 (4570)	
KHM-G11/4-1114-**X-SO760	G – 1 1/4"	315 (4570)	 KHM Forged Housing
KHM-G11/2-1114-**X-SO760	G – 1 1/2"	315 (4570)	
KHM-G2-1114-**X-SO760	G – 2"	315 (4570)	

2.5.3 Ball Valves – Low Pressure

Model Code	Port Size	Max. Pressure Bar (PSI)	Description
KHNVS-Rp1/4-2233-12X	G – 1/4"	64 (930)	
KHNVS-Rp3/8-2233-12X	G – 3/8"	64 (930)	
KHNVS-Rp1/2-2233-12X	G – 1/2"	64 (930)	
KHNVS-Rp3/4-2233-12X	G – 3/4"	40 (580)	
KHNVS-Rp1-2233-12X	G – 1"	40 (580)	
KHNVS-Rp11/4-2233-12X	G – 1-1/4"	25 (360)	
KHNVS-Rp11/2-2233-12X	G – 1-1/2"	25 (360)	
KHNVS-Rp2-2233-12X	G – 2"	25 (360)	
KHNVS-Rp21/2-2233-12X	G – 2 1/2"	16 (230)	
KHNVS-Rp3-2233-12X	G – 3"	16 (230)	
KHNVS-Rp4-2233-12X	G – 4"	16 (230)	

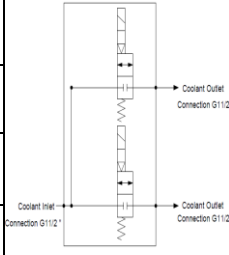
2.5.4 Ball Valves - Low Pressure - Pneumatically Operated for Cooling Lubricants

Model Code	Port Size	Max. Pressure Bar (PSI)	Description
KHN-Rp1/2-2233-AP.E-NC-4BAR	G – 1/2"	50 (725)	
KHN-Rp3/4-2233-AP.E-NC-4BAR	G – 3/4"	40 (580)	
KHN-Rp1-2233-AP.E-NC-4BAR	G – 1"	40 (580)	
KHN-Rp11/4-2233-AP.E-NC-4BAR	G – 1 1/4"	40 (580)	
KHN-Rp11/2-2233-AP.E-NC-4BAR	G – 1 1/2"	40 (580)	
KHN-Rp2-2233-AP.E-NC-4BAR	G – 2"	40 (580)	
KHN-Rp3-2233-AP.E-NC-4BAR	G – 3"	40 (580)	
KHN-Rp4-2233-AP.E-NC-4BAR	G – 4"	40 (580)	
Note: 4BAR in model code indicates actuator used will operate ball valve at this minimum air pressure.			

2.5.5 2/2 Way Piston Valves (CXK Series) for Cooling Lubricants

Model Code	Pressure Range Bar (PSI)	Port Size	Description
CXK02-2/2-FC-3/15/016/012PP	0 - 16 (230)	G 1/2	2/2 Way Piston Valves NC (Closing against Flow Direction) Externally Controlled 
CXK02-2/2-FC-3/20/016/034PP	0 - 16 (230)	G 3/4	
CXK02-2/2-FC-3/25/016/100PP	0 - 16 (230)	G 1	
CXK02-2/2-FC-3/32/012/114PP	0 - 12 (175)	G 1-1/4	
CXK02-2/2-FC-3/40/008/112PP	0 - 08 (115)	G 1-1/2	
CXK02-2/2-FC-3/50/004/200PP	0 - 04 (60)	G 2	

2.5.6 2/2 Way Piston Valve Blocks – for Cooling Lubricants

Block Part Number	Flow Range	Pressure Range	Port Size	Description	 
03588599	77 GPM (290 LPM)	145 PSI (10 Bar)	G 1"	CXK02 (4) Valve Block	
03588596	95 GPM (358 LPM)	100 PSI (7 Bar)	G 1 1/4"	CXK02 (3) Valve Block	
03588552	116 GPM (440 LPM)	87 PSI (6 Bar)	G 1 1/2"	CXK02 (2) Valve Block	

2.5.7 2/2 Way Piston Valve Stacks – for Cooling Lubricants



Model Code	Port Sizes	Description	Pressure Bar (PSI)
CXKM-2/2-F/C-6/10/020/100-PV-24V-M12-2XL	G1" In - G1/2" Out	Two Valve Stack, Pilot Operated, NC against flow	20 (290)
CXKM-2/2-F/C-6/25/020/114-PV-24V-M12-2XL	G1-1/4" In - G1" Out		
CXKM-2/2-F/C-6/10/020/100-PV-24V-M12-3XL	G1" In - G1/2" Out	Three Valve Stack, Pilot Operated, NC against flow	
CXKM-2/2-F/C-6/25/020/114-PV-24V-M12-3XL	G1-1/4" In - G1" Out		
CXKM-2/2-F/C-6/10/020/100-PV-24V-M12-4XL	G1" In - G1/2" Out	Four Valve Stack, Pilot Operated, NC against flow	
CXKM-2/2-F/C-6/25/020/114-PV-24V-M12-4XL	G1-1/4" In - G1" Out		

2.5.8 2/2 Way Coaxial Valves – Modular (CX**M Series) for Cooling Lubricants

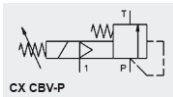
Model Code	Pressure Range Bar (PSI)	Port Size	Description
CX04M-2/2-D/C-2/10/064/014/24V-M12	0 - 64 (930)	G 1/4	2/2 Way Coaxial Valves Modular NC Direct Operated, Brass 24VDC Solenoid with M12X1 Connector 
CX04M-2/2-D/C-2/10/064/038/24V-M12	0 - 64 (930)	G 3/8	
CX04M-2/2-D/C-2/15/064/012/24V-M12	0 - 64 (930)	G 1/2	
CX04M-2/2-D/C-2/20/064/034/24V-M12	0 - 64 (930)	G 3/4	
CX04M-2/2-D/C-2/25/064/100/24V-M12	0 - 64 (930)	G 1	
CX04M-2/2-D/C-2/32/064/112/24V-M12	0 - 64 (930)	G 1-1/2	
CX06M-2/2-F/C-2/10/064/014	0 - 64 (930)	G 1/4	2/2 Way Coaxial Valves Modular NC Externally Controlled 
CX06M-2/2-F/C-2/10/064/038	0 - 64 (930)	G 3/8	
CX06M-2/2-F/C-2/15/064/012	0 - 64 (930)	G 1/2	
CX06M-2/2-F/C-2/20/064/034	0 - 64 (930)	G 3/4	
CX06M-2/2-F/C-2/25/064/100	0 - 64 (930)	G 1	
CX06M-2/2-F/C-2/32/064/114	0 - 64 (930)	G 1-1/4	

CX**M Modular Valve Mounting Accessories			
Part Number	DN Size	Port Size	Description
03441362	DN10	G 1"	FLANGE COMPLETE RIGHT SIDE (4 Bolts & Seal) 
03441353	DN15	G 1-1/4"	
03441363	DN10	G 1"	FLANGE ONLY LEFT SIDE (No bolts & no seal) 
03441354	DN15	G 1-1/4"	
03441364	DN10		END CAP COMPLETE RIGHT SIDE (4 Bolts & Seal) 
03441395	DN15		
03441385	DN10		END CAP LEFT SIDE (No Bolts & No Seal) 
03441396	DN15		

2.5.9 2/2 and 3/2 Way Coaxial Valves (CX Series) for Cooling Lubricants

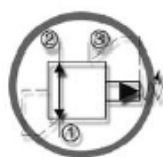
Model Code	Pressure Range Bar (PSI)	Port Size	Description
CX07-2/2-F/C-2/10/120/014	0 - 120 (1740)	G 1/4	2/2 Way Coaxial Valves NC Externally Controlled 
CX07-2/2-F/C-2/10/120/038	0 - 120 (1740)	G 3/8	
CX07-2/2-F/C-2/15/120/012	0 - 120 (1740)	G 1/2	
CX07-2/2-F/C-2/20/120/034	0 - 120 (1740)	G 3/4	
CX07-2/2-F/C-2/25/120/100	0 - 120 (1740)	G 1	
CX07-2/2-F/C-2/32/120/114	0 - 120 (1740)	G 1-1/4	
CX07-2/2-F/C-2/40/120/112	0 - 120 (1740)	G 1-1/2	
CX07-2/2-F/C-2/50/120/200	0 - 120 (1740)	G 2	
CX07-3/2-F/C-2/10/100/014	0 - 100 (1450)	G 1/4	3/2 Way Coaxial Valves NC Externally Controlled 
CX07-3/2-F/C-2/10/100/038	0 - 100 (1450)	G 3/8	
CX07-3/2-F/C-2/15/100/012	0 - 100 (1450)	G 1/2	
CX07-3/2-F/C-2/20/100/034	0 - 100 (1450)	G 3/4	
CX07-3/2-F/C-2/25/100/100	0 - 100 (1450)	G 1	
CX07-3/2-F/C-2/32/100/114	0 - 100 (1450)	G 1-1/4	
CX07-3/2-F/C-2/40/100/112	0 - 100 (1450)	G 1-1/2	
CX07-3/2-F/C-2/50/100/200	0 - 100 (1450)	G 2	

2.5.10 Pressure Relief Valve – Direct Acting, Seat Type – for Cooling Lubricants

Model Code	Pressure Range	Flow Range	Description
<u>DB12120A-01X150V</u>	2175 PSI (150 Bar)	32 GPM (120 LPM)	Pressure Relief Valve DB12 
<u>CX CBV15 120 G1 FP 24V</u>	1740 PSI (120 Bar)	32 GPM (120 PM)	 

2.5.11 Cartridge Valves - UNF Size 06/08/10/12/16 (Reference Hydac Cartridge Valve Catalog #02087369)

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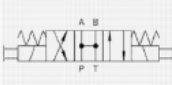
Manifold Quotation Request Form



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2.5.12 Directional Control Valves - CETOP

Plug: M12x1 or DIN 43650 for 24 VDC

Type	Size	Symbol	Max. Pressure	Catalogue	Description
4 WE 6 D	NG 6	4 / 2 	Up to 320 bar Up to 80 l/min	Data sheet by request	
4 WE 6 EA	NG 6	4 / 2 	Up to 320 bar Up to 80 l/min	Data sheet by request	
4 WE 6 E	NG 6	4 / 3 	Up to 320 bar Up to 80 l/min	Data sheet by request	
4 WE 6 G	NG 6	4 / 3 	Up to 320 bar Up to 60 l/min	Data sheet by request	
4 WE 6 H	NG 6	4 / 3 	Up to 320 bar Up to 80 l/min	Data sheet by request	
4 WE 6 J	NG 6	4 / 3 	Up to 320 bar Up to 60 l/min	Data sheet by request	
4 WE 10 D	NG 10	4 / 2 	Up to 320 bar Up to 120 l/min	Data sheet by request	
4 WE 10 EA	NG 10	4 / 2 	Up to 320 bar Up to 120 l/min	Data sheet by request	
4 WE 10 E	NG 10	4 / 3 	Up to 320 bar Up to 120 l/min	Data sheet by request	
4 WE 10 G	NG 10	4 / 3 	Up to 320 bar Up to 120 l/min	Data sheet by request	
4 WE 10 H	NG 10	4 / 3 	Up to 320 bar Up to 120 l/min	Data sheet by request	
4 WE 10 J	NG 10	4 / 3 	Up to 320 bar Up to 120 l/min	Data sheet by request	

2.5.13 Reservoir Breathers (BF, BL, BLT & BD Series)

Breather	Max. Flow	Element	Connection	Notes
 page 92	35/10 SCFM 250/80 GPM	3 or 10 µm phenolic resin impregnated paper	Threaded 1/4 to 3/4" BSPP (male)	Carbon Steel with External Epoxy Coating and Zinc Plated Internals Pressurized (optional)
 page 93	25 SCFM 200 GPM	3 or 10 µm phenolic resin impregnated paper	Threaded 3/8 to 3/4" BSPP (male)	Durable Synthetic Material (PA 6) Pressurized (optional)
 page 94	65 SCFM 500 GPM	3 or 10 µm phenolic resin impregnated paper <i>Replaceable</i>	Threaded 1" BSPP (male)	Durable Synthetic Material (PA 6) with optional differential gauge
 page 96	110 SCFM 850 GPM	3 or 10 µm phenolic resin impregnated paper	Threaded, Flanged, or Welded	Spin-on elements (BL...) Dehumidifying element (BLT...)
 page 99	100 SCFM 750 GPM	2µm <i>Disposable</i>	Threaded, Flanged, or Bayonet	Silica Gel Desiccant adsorbs water then changes color to indicate when breather should be changed

2.5.14 Fluid Level Indicators (FSA)

Model Code	Mounting Hole Centers
FSA 127-1.1/-/12	5 Inches
FSA 254-1.1/-/12	10 Inches



2.5.15 Diagnostic Test Points & Micro Bore Flex Hoses - 1620 Series

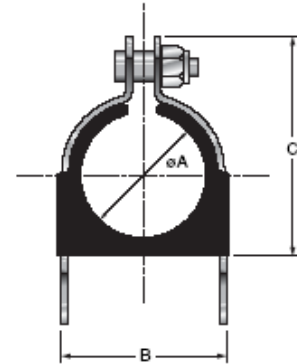
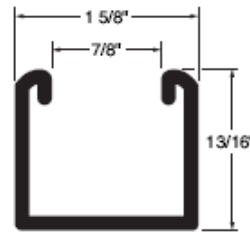


Part Number	Port Size	Max. Pressure Bar (PSI)	Description
00606304	G-1/4" M to M16 x 2.0 M	630 (9000)	Carbon Steel Test Point w/Viton Seals.
06003824	G-1/4" F to M16 x 2.0 F	630 (9000)	Direct Gauge Adapter
00687889	M16 x 2.0 M M16 x 2.0 M	630 (9000)	Hose to Hose Coupling
06003726	M16 x 2.0 F M16 x 2.0 F	500 (7250)	Micro Bore Hose - 630mm (24.8") Long
06003727	M16 x 2.0 F M16 x 2.0 F	500 (7250)	Micro Bore Hose - 1250mm (49.21") Long
00682860	M16 x 2.0 F M16 x 2.0 F	500 (7250)	Micro Bore Hose - 2500mm (98.43") Long

2.5.16 Clamps - CUSH Series

CUSH Series Cushion Clamps

Dimensions



Description

Cushion clamps are ideal for multiple line runs, while absorbing shock and vibration, reducing unwanted noise and preventing galvanic corrosion.

Features

- Distortion free clamping
- Shock and vibration reduction
- Elimination of rotation
- Retrofit without disassembly
- Easy installation
- Control squeeze shoulder bolt prevents over tightening of the clamp assembly, preventing the possibility of crushing the tube.
- Fits standard 1-5/8" wide mounting rail

Materials

- Clamp - carbon steel
(with electrochromate finish)
- Cushion - thermoplastic elastomer
- Cushion material withstands the effect of most oils, chemicals and industrial cleaning solvents at temperatures -40° to 275°F.

Mounting Rail

- Part Number: 02073325
- Model Code: Cush Rail 1" x 4' Green
- Material: Low gauge carbon steel
- Finish: Green paint
- Length: 10'0"

Model Code	Application		Nom. Pipe Size in.	Dimensions			Part No.
	Copper & Steel Tubing in.	Copper Water Pipe (nom.) in.		A in.	B in.	C in.	
<i>CUSH 1/4T</i>	1/4			0.25	0.62	0.98	<i>02073330</i>
CUSH 3/8T	3/8	1/4		0.37	0.82	1.13	02073331
CUSH 1/2T	1/2	3/8		0.50	0.94	1.34	02073332
CUSH 1/4P			1/4	0.54	0.98	1.34	02073361
CUSH 5/8T	5/8	1/2		0.62	1.06	1.54	02073333
<i>CUSH 3/8P</i>			3/8	0.67	1.13	1.54	<i>02073362</i>
CUSH 3/4T	3/4	5/8		0.75	1.20	1.68	02073334
<i>CUSH 1/2P</i>			1/2	0.84	1.29	1.82	<i>02073363</i>
CUSH 7/8T	7/8	3/4		0.87	1.31	1.82	02073335
CUSH 1T	1			1.00	1.44	1.95	02073336
CUSH 3/4P			3/4	1.05	1.50	1.95	02073364
<i>CUSH 1-1/8T</i>	1 1/8	1		1.12	1.57	2.08	<i>02073337</i>
CUSH 1-1/4T	1 1/4			1.25	1.70	2.21	02073338
CUSH 1P			1	1.31	1.76	2.34	02073365
<i>CUSH 1-3/8T</i>	1 3/8	1 1/4		1.37	1.82	2.34	<i>02073339</i>
CUSH 1-1/2T	1 1/2			1.50	1.95	2.47	02073340
CUSH 1-5/8T	1 5/8	1 1/2		1.62	2.07	2.60	02073341
CUSH 1-1/4P			1 1/4	1.66	2.17	2.73	02073366
CUSH 1-3/4T	1 3/4			1.75	2.20	2.73	02073342
<i>CUSH 1-7/8T</i>	1 7/8			1.87	2.32	2.86	<i>02073343</i>
CUSH 1-1/2P			1 1/2	1.90	2.35	2.86	02073367
CUSH 2T	2			2.00	2.45	3.04	02073344
<i>CUSH 2-1/8T</i>	2 1/8			2.12	2.57	3.23	<i>02073345</i>
CUSH 2-3/8T	2 3/8			2.37	2.82	3.67	02073346
CUSH 2P			2	2.37	2.82	3.67	02073368
<i>CUSH 2-5/8T</i>	2 5/8			2.62	3.07	3.92	<i>02073348</i>
CUSH 2-1/2P			2 1/2	2.87	3.32	4.17	02073369
<i>CUSH 3-1/8T</i>	3 1/8			3.12	3.57	4.42	<i>02073351</i>
<i>CUSH 3P</i>			3	3.50	3.95	4.79	<i>02073370</i>
<i>CUSH 4P</i>	4			4.50	4.95	5.95	<i>02073372</i>
<i>CUSH 5P</i>	5			5.56	6.01	6.92	<i>02073373</i>
<i>CUSH 6P</i>	6		3	6.62	7.07	8.23	<i>02073374</i>

Tube Series: T = with Controlled Squeeze Shoulder Bolt (sizes 1 3/8" and smaller)

Pipe Series: P = without Controlled Squeeze Shoulder Bolt

Dimensions are for general information only. Due to constant development and updating of details, we ask that all critical dimensions be verified by requesting a certified print.

Model Codes containing selections listed in red italics are non-standard items – Minimum quantities may apply – Contact HYDAC for information and availability

2.5.17 Clamps – DIN 3015 (HRL & HRS Series) Reference Hydac Hydraulic Accessories Catalog #02080105

DIN 3015 Clamps **HYDAC**

DIN 3015 Clamp Overview

HYDAC Manufactures a complete line of hose, tube, and pipe mounting components according to the DIN 3015 standard.

HYDAC clamps assure a simple, reliable dampening support for lines. HYDAC clamps absorb shock, dampen vibration, and reduce noise in plumbing systems

Series

HRL - Standard Duty (see pages 51 - 52)



- Available to 2" tube outside diameter.
- Recommended for systems with less than 1500 PSI operating pressure and no dynamic loads.

HRS - Heavy Duty (see pages 53 - 54)



- Available to 16" nominal pipe size
- Recommended for systems with greater than 1500 PSI operating pressure, operations with pressure surges and applications with wide temperature fluctuations.

HRZ - Twin (see pages 55 - 56)



- Available to 1-1/4" nominal pipe size
- Recommended for systems with less than 1500 PSI operating pressure and no dynamic loads

HREL - Standard Duty w/ Rubber Insert (see pages 57 - 58)



- Available to 2" tube outside diameter
- Recommended for systems with less than 1500 PSI operating pressure and no dynamic loads
- Provide for greater noise reduction and resistance to axial movement

HRES - Heavy Duty w/ Rubber Insert (see pages 59 - 60)



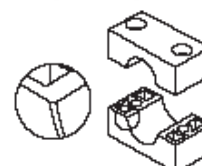
- Heavy duty available to 5 1/4" bore diameter
- Provide for greater noise reduction and resistance to axial movement

Bore Styles

Standard duty, heavy duty, and twin series are available with either ribbed bores (standard) or smooth bore (special order). When ordering a smooth bore arrangement or clamp pairs, a "G" is inserted in the code directly after the "HR" i.e. HRGL, HRGS, and HRGZ



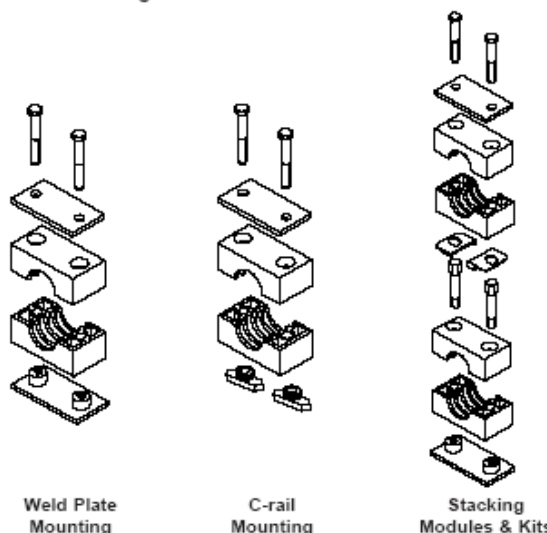
Ribbed Bore
(standard)



Smooth Bore
smooth surface and chamfered edge
prevent chaffing of hoses
(special)

Arrangements

Various arrangements are available in each series.



Materials

Metal components are carbon steel (standard.) Stainless steel is also available (see page 64 for details.) Metal components to be welded (weld plates and c-rails) and heavy duty top plates size 5-8 are phosphate coated, while all other metal components are zinc plated. Clamp pairs are polypropylene (standard.) Polyimide and aluminum clamp pairs are also available. For specifications on these materials, see page 65

Ordering

Clamps can be ordered as complete arrangements, or separate components. See each series for details.

2.6 ELECTRONIC MONITORING DEVICES

EDS 3000



2.6.1 Pressure Switch / Transducer - Programmable

Model Code	Sensor Type	Pressure Range	Output / Electrical Connector	BSPP Male Port Size
EDS3346-2-0001-000	Ceramic	-14.5 to 14.5 PSI	2 Switch / M12-4 Pin	G – 1/4"
EDS3446-2-0040-000	Thin Film	0 to 580 PSI	2 Switch / M12-4 Pin	G – 1/4"
EDS3446-2-0100-000	Thin Film	0 to 1450 PSI	2 Switch / M12-4 Pin	G – 1/4"
EDS3446-2-0250-000	Thin Film	0 to 3625 PSI	2 Switch / M12-4 Pin	G – 1/4"
EDS3348-5-0001-000	Ceramic	-14.5 to 14.5 PSI	2 Switch with Analog / M12-5 Pin	G – 1/4"
EDS3448-5-0040-000	Thin Film	0 to 580 PSI	2 Switch with Analog / M12-5 Pin	G – 1/4"
EDS3448-5-0100-000	Thin Film	0 to 1450 PSI	2 Switch with Analog / M12-5 Pin	G – 1/4"
EDS3448-5-0250-000	Thin Film	0 to 3625 PSI	2 Switch with Analog / M12-5 Pin	G – 1/4"



2.6.2 Pressure Switch - Programmable

Model Code	Sensor Type	Pressure Range	Output / Electrical Connector	BSPP Male Port Size
EDS8446-2-0025-000	Thin Film	0 to 25 Bar/363 PSI	2 Switch / M12-4 Pin	G – 1/4"
EDS8446-2-0040-000	Thin Film	0 to 40 Bar/580 PSI	2 Switch / M12-4 Pin	G – 1/4"
EDS8446-2-0100-000	Thin Film	0 to 100 Bar/1450 PSI	2 Switch / M12-4 Pin	G – 1/4"
EDS8446-2-0250-000	Thin Film	0 to 250 Bar/3625 PSI	2 Switch / M12-4 Pin	G – 1/4"

HDA 4400 & 4700



2.6.3 Pressure Transducer

Model Code	Sensor Type	Pressure Range	Output / Electrical Connector	BSPP Male Port Size
HDA4446-A-006-000	Thin Film	0 to 87 PSI	4-20 mA / M12-4 Pin	G – 1/4"
HDA4446-A-060-000	Thin Film	0 to 870 PSI	4-20 mA / M12-4 Pin	G – 1/4"
HDA4446-A-100-000	Thin Film	0 to 1450 PSI	4-20 mA / M12-4 Pin	G – 1/4"
HDA4446-A-250-000	Thin Film	0 to 3625 PSI	4-20 mA / M12-4 Pin	G – 1/4"
HDA4446-B-006-000	Thin Film	0 to 87 PSI	0-10 VDC / M12-4 Pin	G – 1/4"
HDA4446-B-060-000	Thin Film	0 to 870 PSI	0-10 VDC / M12-4 Pin	G – 1/4"
HDA4446-B-100-000	Thin Film	0 to 1450 PSI	0-10 VDC / M12-4 Pin	G – 1/4"
HDA4446-B-250-000	Thin Film	0 to 3625 PSI	0-10 VDC / M12-4 Pin	G – 1/4"

ETS3200



ETS3800



2.6.4 Temperature Switch and Transducer

Model Code	Probe Length mm (inch)	Temperature Range °C (°F)	Output / Electrical Connector	BSPP Male Port Size
ETS3226-2-018-000	18 (0.71)	-25 to 100 (-13 to 212)	2 Switch / M12-4 Pin	G – 1/2"
ETS3228-5-018-000	18 (0.71)	-25 to 100 (-13 to 212)	2 Switch with Analog / M12-5 Pin	G – 1/2"
ETS3866-2-000-000	TFP-100	-30 to 125 (-22 to 257)	2 Switch / M12-4 Pin	N / A
ETS3868-5-000-000	TFP-100	-30 to 125 (-22 to 257)	2 Switch with Analog / M12-5 Pin	N / A

2.6.5 Fluid Temperature/Level Switch and Transducer

Model Code	Sensor Length mm (inch)	Temperature Range °C (°F)	Output / Electrical Connector
ENS311P-8-0250-000-K	250 (10.00)	0° to 60° (32° to 140°)	4 Switch with 2 Analog (0-10V) / M12-8 Pin
ENS311P-8-0410-000-K	410 (16.14)	0° to 60° (32° to 140°)	
ENS311P-8-0520-000-K	520 (20.5)	0° to 60° (32° to 140°)	
ENS311P-8-0730-000-K	730 (28.7)	0° to 60° (32° to 140°)	

ENS 3000



2.6.6 Sediment & Water Contamination Sensors (CS1000 & AS3000)



Model Code	Part Number	Description
CS1220-A-0-0-0-0/-000	03236362	4-20mA display model
CS1210-A-0-0-0-0/-000	03240458	4-20mA non-display model
CS1220-A-0-0-0-1/-K	02087348	4-20mA display model and CS Block Kit
CS1220-A-0-0-0-1/-KAS	02086855	4-20mA display model and CS Block Kit with Water sensor
AS 3008-5-000	922591	4-20mA Water Sensor with Display

2.7 ELECTRONIC ACCESSORIES

Description	Model Code	Part Number	Type	Visual Aid
2.7.1 Connectors with & without Cables	ZBE 06	06006788	4 Pole M12x1 90°	
	ZBE 08	06006786	5 Pole M12x1 90°	
	ZBE 06-05-04	02701197	4 Pole M12x1 90° w/5 Meter Cable	Color Code: 1 = brown 2 = white 3 = blue 4 = black
	ZBE 08-05-05	06006791	5 Pole M12x1 90° w/5 Meter Cable	
	CS1000 and ENS3000 Cable	03281220	8 Pole M12x1 90° w/5 Meter Cable	
2.7.2.1 Temp Sensor Probe	TPF-100	00904696	For use with ETS3800 Series Temperature Switch	TFP 100 Part # 00904696
2.7.2.2 Bulb Well	Safety Sleeve	00906170	For use with TFP-100 Probe	Safety Sleeve TFP 100 Part # 00906170
2.7.2.3 Temp/Level Adapter	ZBM 20	00908739	ENS 3000 Adapter G3/4 BSPP	
2.7.2.4 Swivel Adapter	ZBM 14	00907818	EDS 8000 Adapter G1/4 BSPP	

2.8.1 Air to Oil Heat Exchangers (SC/OK/OKC/ELH/FLKS/ Series) 12 & 24 Volt DC coolers may not be used.



ELH Series - Hydraulic Motor Drive



OK Series



ELKS Series

2.8.2 Water to Oil Heat Exchangers (PFC Series)



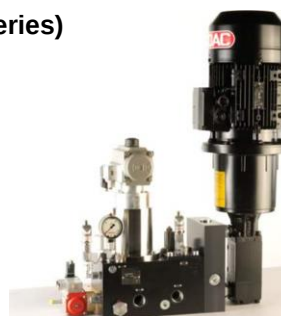
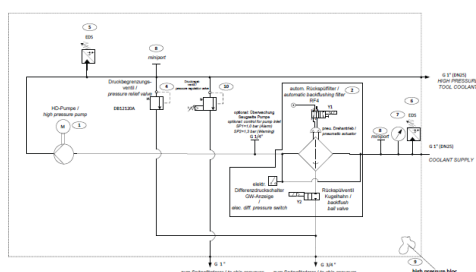
2.8.3 Water to Water Heat Exchangers (FWKS Series)



2.9 COMPLETE HYDRAULIC, LUBRICATION & COOLANT SYSTEM PACKAGING



2.9.1 High Pressure Coolant Booster Unit (PBU Series)



3.0 TECHNICAL CLEANLINESS - LAB EQUIPMENT / SUPPORT

CONTAMINATION TESTING UNITS AND MODULES



CTU-1000

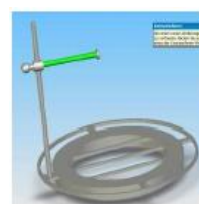


CTM-SC

CTM-EB



CTM-EF



MANIPULATORS

PARTS CLEANLINESS EVALUATIONS TO ISO 16232 / VDA 19

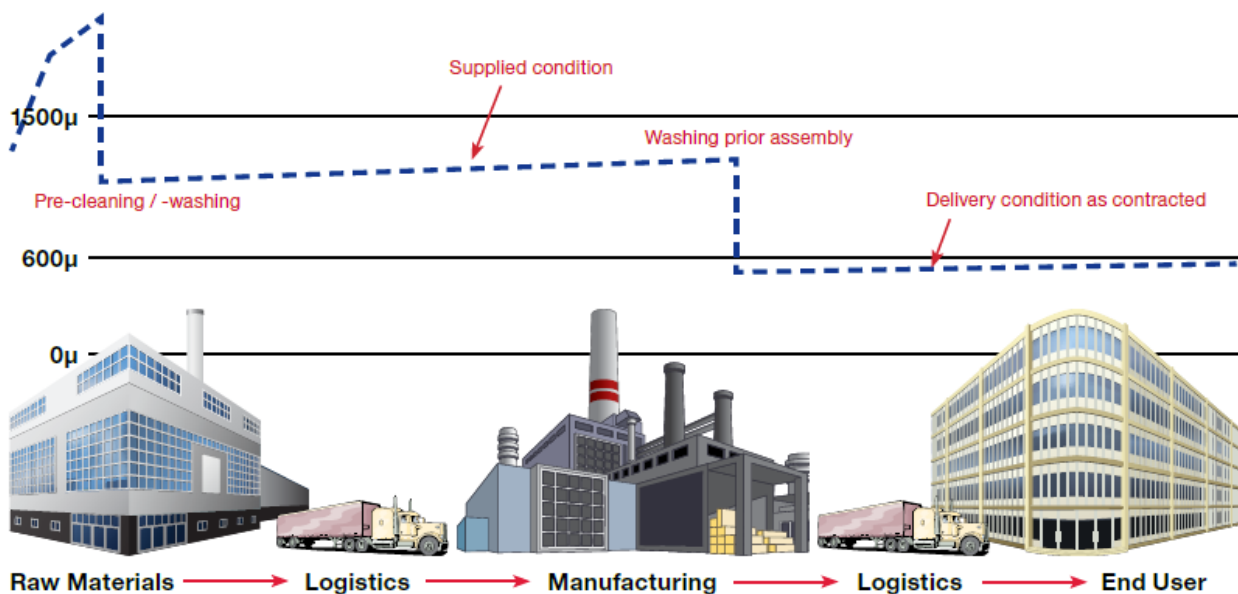


Particle Size (µm)	Total No. of Particles	No. of Reflecting Particles
5 - 15	39.731	6.873
15 - 25	8.287	1.877
25 - 50	4.352	2.195
50 - 100	856	619
100 - 150	98	79
150 - 200	42	37
200 - 400	29	25
400 - 600	3	3
600 - 1000	0	0
>1000	1	1

Pore Size of Membrane	5 µm
Total / Component	0.6 mg



COMPONENT CLEANLINESS PROCESS CHAIN ANALYSIS



4.0 SERVICE AND SUPPORT

	NORTH AMERICA	EUROPE	JAPAN	EAST ASIA
Company	HYDAC Technology Corporation	HYDAC International GmbH	HYDAC Co. Ltd.	HYDAC Technology Shanghai Limited
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E-Mail	sschwartz@hydacusa.com	ulrich.mertin@hydac.com	pierre.colin@hydac.co.jp	haibo@hydac.cn

5.0 ORDERING INFORMATION

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