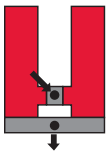
NFHD Series

Modular Inline Duplex Filters

500 psi • up to 450 gpm



Features

- Top access for easy element changeout.
- All models have an air bleed valve (vent) installed in the lid.
- Single large element with no leak points for highest efficiency and dirt capacity
- Lid with swing bolts for fast servicing without tools
- Drain port - dirty side (right side of Inlet Port) SAE 12 (3/4")
- Clogging Indicator for local and remote signals
- Easily banked in parallel (manifolded) for high viscosity applications.
- Available with Betterfit elements - consult HYDAC.

Notes: This filter is configured with an .....R.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

Applications

Automotive

Gearboxes

Industrial

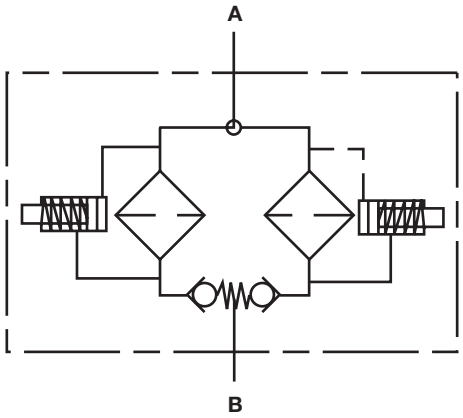
Power Generation

Pulp & Paper

Shipbuilding

Steel / Heavy Industry

Hydraulic Symbol



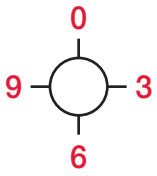
Inlet / Outlet Port Location Configurator

NFHD1300/2600 Inlet/Outlet Available Configurations

	03		09
	33		39
	93		99

NFHD5200/7800/10400 2.X Inlet/Outlet Available Configurations

00	03		09
30	33		39
60			69
	93		99



0 = Pointed to Top
3 = Pointed to Front
6 = Pointed to Bottom
9 = Pointed to Back

First Number = Inlet Orientation
Second Number = Outlet Orientation

Technical Specifications

Mounting Method	Floor mounting brackets
Port Connection	SAE DN 102 Flange Code 61
Flow Direction (Standard)	Inlet: Side Outlet: Side
Construction Materials	
Head, Lid, Elbows, Manifolds	Ductile Iron
Housing	Steel
Flow Capacity	
1300	343 gpm (1300 lpm)
2600, 5200, 7800, 10400	450 gpm (1700 lpm) *(Flow limited by 4" pipe size)*
Housing Pressure Rating	
Max. Allowable Working Pressure	500 psi (34 bar)
Fatigue Pressure	500 psi (34 bar)
Burst Pressure	> 1440 psi (100 bar)
Element Collapse Pressure Rating	
ON, W/HC	290 psid (20 bar)
ECON2, BN4AM, AM, P/HC	145 psid (10 bar)
Fluid Temp. Range	14°F to 212°F (-10°C to 100°C)
Consult HYDAC for applications below 14°F (-10°C)	
Fluid Compatibility	
Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.	
Indicator Trip Pressure	
ΔP = 29 psid (2 bar) -10% *(standard)*	
ΔP = 72 psid (5 bar) -10% *(optional)*	
Bypass Valve Cracking Pressure	
ΔP = 43 psid (3 bar) +10%	
ΔP = 87 psid (6 bar) +10%	

PN#02081318 / 07.19 / FIL1907-2109

Model Code

NFHD ON 1300 E A P 3 BM 1 . X / 16 V

Filter Type
NFHD = In-line Duplex Return Line Filter

Element Media
ON = Optimicron®
ECON2 = ECOmicron® *(Low Collapse)*
W/HC = Wire Mesh
BN/AM = Betamicron®/Aquamicron®
AM = Aquamicron®
P/HC = Polyester

Size
1300, 2600, 5200, 7800, 10400

Operating Pressure
E = 500 psi (34 bar)

Type of Change Over
A = Ball valve

Type of Connection
P = SAE DN 102 (4") Code 61 flange

Filtration Rating *(micron)*
1, 3, 5, 10, 15, 20 = ON
40 = AM
3, 10 = BN/AM
25, 50, 100, 200 = W/HC
3, 5, 10, 20 = BN/HC, ECO/N
10, 20 = P/HC

Type of ΔP Clogging Indicator
A, BM, C, D *(Others available upon request, see Clogging Indicators section.)*

Type Number
1

Modification Number *(latest version always supplied)*

Port Configuration
16 = SAE DN 102, (4") Code 61 Flange

Seals
(omit) = Nitrile rubber (NBR) *(standard)*
V = Fluorocarbon elastomer (FKM)
EPR = Ethylene propylene rubber (EPR)

Bypass Valve
(omit) = 43 psid (3 bar) *(standard)*
B1 = 14.5 psid (1 bar) *(lube or coolant)*
B6 = 87 psid (6 bar) *(return line extended life)*
KB = no bypass *(flushing system)*
not available with ECON2

Supplementary Details
L24, L48, L110, L220 = Lamp for D-type clogging indicator *(LXX, XX = voltage)*
T100 = Indicator Thermal Lockout, 100°F *(C & D indicators only)*
cRUus = Electrical Indicator with underwriter's recognition
SO263 = Modification of elements for Skydrol or HYJET phosphate ester fluids
SFREE = Element specially designed to minimize electrostatic charge generation
SO376 = Modification of ON and W/HC elements for HFA, HFB, HFC, and HFD flame retardant liquids
SB = Equalization valve set
EM = Manual vent valve set
VKD = Drain manifold

Flow Path
00, 03, 09, 30, 33, 39, 60, 69, 93.99
Note: For Alternate Connection Flow Path *(i.e. 39 - Inlet Front / Outlet Back)* - See previous page for "Inlet / Outlet Port Configurator."

Replacement Element Model Code

1300 R 003 ON / V

Size
1300 - for housings: 1300
2600 - for housings: 2600, 5200, 7800, 10400

Filtration Rating *(micron)*
1, 3, 5, 10, 15, 20 = ON
3, 5, 10, 20 = ECON2
40 = AM
25, 50, 100, 200 = W/HC
3, 5, 10, 20 = XSX
3, 10 = BN4AM
10, 20 = P/HC

Element Media
ON, XSX, BN4AM, ECON2, AM, W/HC, P/HC

Seals
(omit) = Nitrile rubber (NBR) *(standard)*
V = Fluorocarbon elastomer (FKM)
EPR = Ethylene propylene rubber (EPR)

Bypass Valve
(omit) = 43 psid (3 bar) *(standard)*
B1 = 14.5 psid (1 bar)
B6 = 87 psid (6 bar)
KB = no bypass

Supplementary Details
SO263 = *(same as above)*
SFREE = *(same as above)*
SO376 = *(same as above)*

Clogging Indicator Model Code

VM 2 BM . X /

Indicator Prefix
VM = G 1/2 3000 psi

Trip Pressure
2 = 29 psid (2 bar)
5 = 72 psid (5 bar)
(optional)

Type of Indicator
A = No indicator, plugged port
BM = Pop-up indicator *(manual reset)*
C = Electric switch - SPDT
D = Electric switch and LED light - SPDT

Modification Number

Supplementary Details

Seals
(omit) = Nitrile rubber (NBR) *(standard)*
V = Fluorocarbon elastomer (FKM)
EPR = Ethylene propylene rubber (EPR)

Light Voltage *(D type indicators only)*
L24 = 24V
L110 = 110V

Thermal Lockout *(VM, VD types C, D, J, and J4 only)*
T100 = Lockout below 100°F

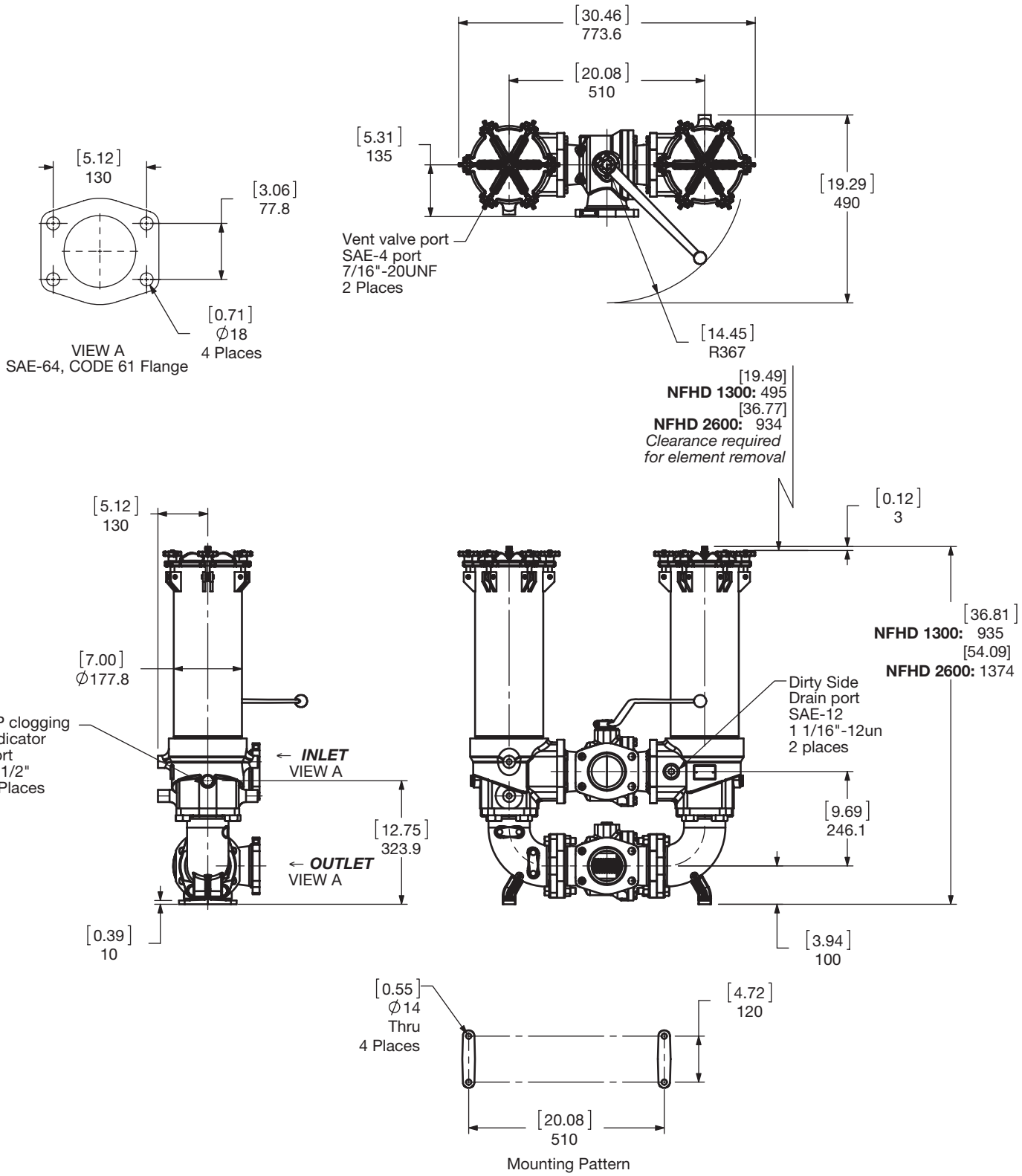
Underwriters Approval *(VM, VD types C, D, J, and J4 only)*
cRUus = Electrical Indicator with underwriter's recognition

(For additional details and options, see Clogging Indicators section.)

Model Codes Containing RED are non-stock items — Minimum quantities may apply – Contact HYDAC for information and availability

LOW PRESSURE FILTERS

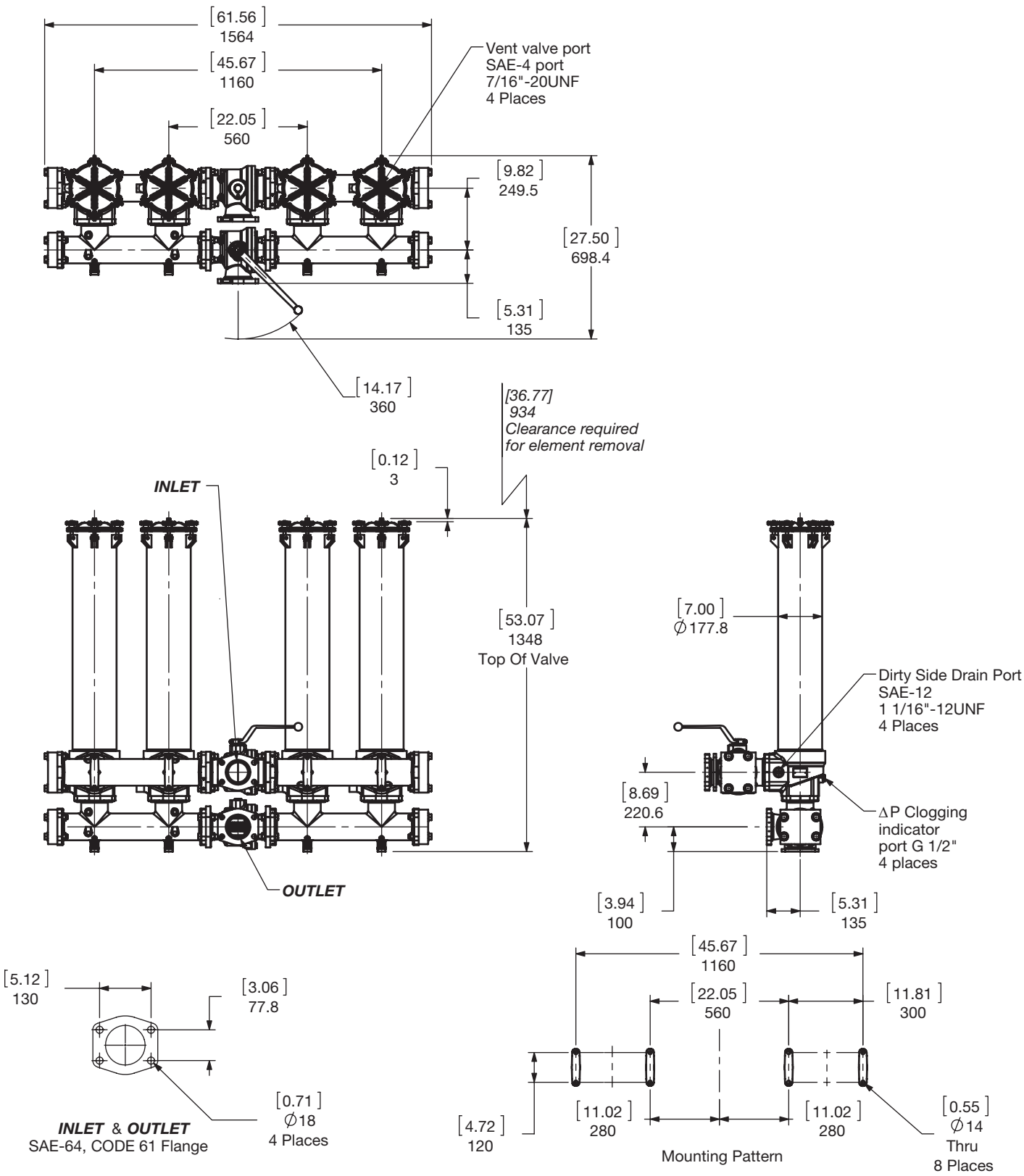
Dimensions
NFHD 1300 / 2600



Size	1300	2600
Weight (lbs.)	302.1	357

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element.
For complete dimensions please contact HYDAC to request a certified print.

Dimensions:
NFHD 5200

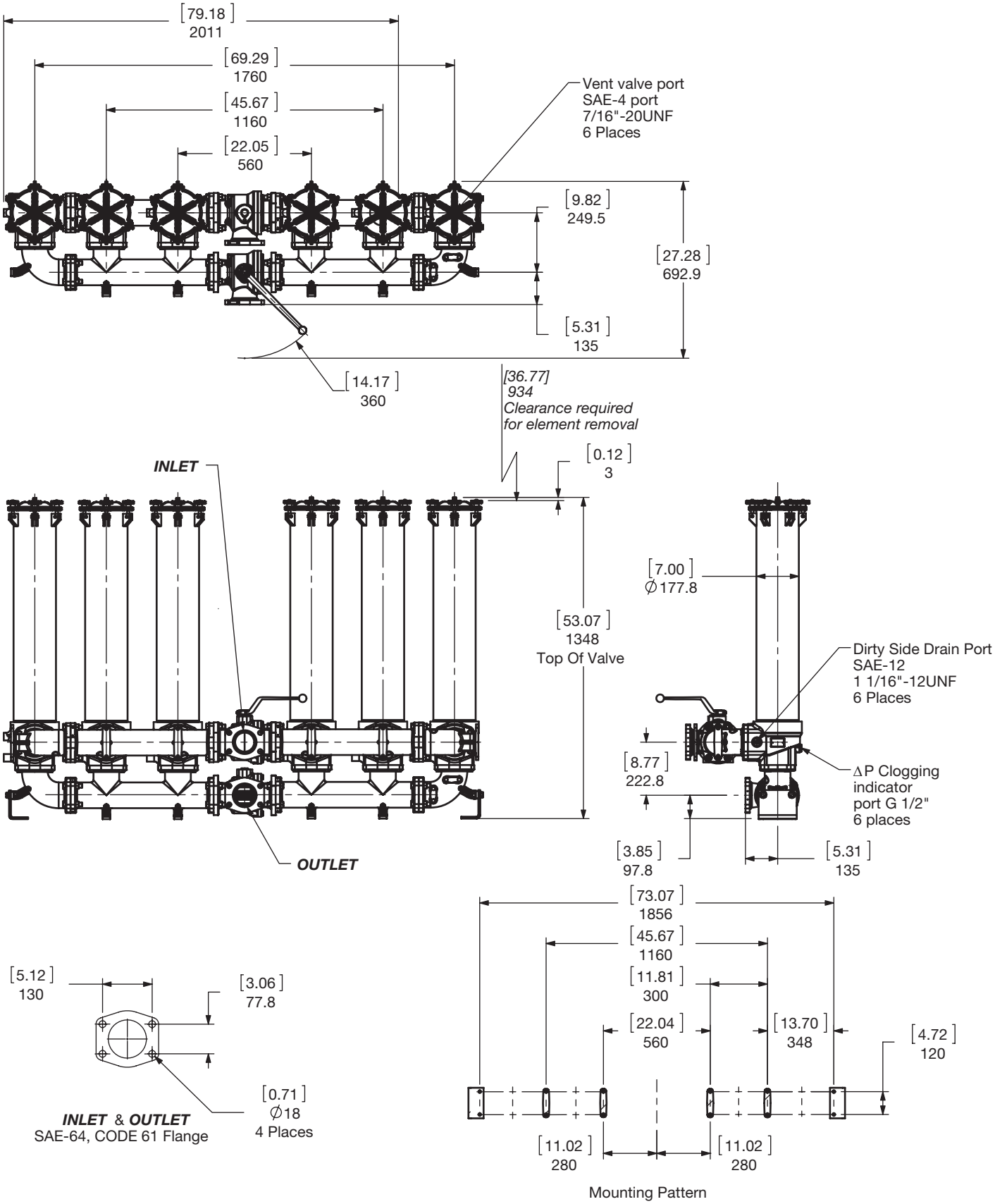


Size	5200
Weight (lbs.)	803

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element.
For complete dimensions please contact HYDAC to request a certified print.

LOW PRESSURE FILTERS

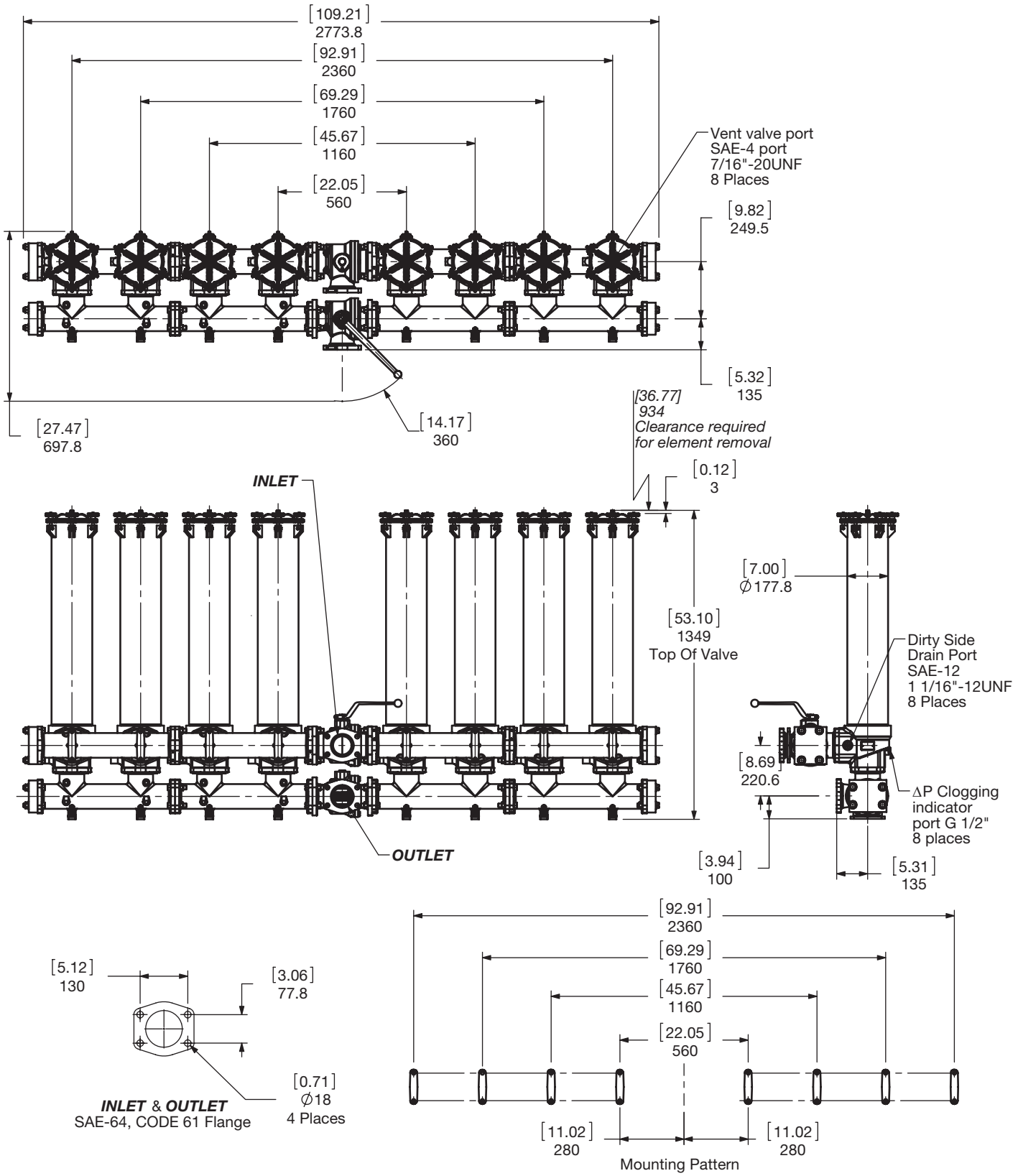
Dimensions:
NFHD 7800



Size	7800
Weight (lbs.)	1008

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element.
For complete dimensions please contact HYDAC to request a certified print.

Dimensions:
NFHD 10400



Size	10400
Weight (lbs.)	1459

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element.
For complete dimensions please contact HYDAC to request a certified print.

LOW PRESSURE FILTERS

Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

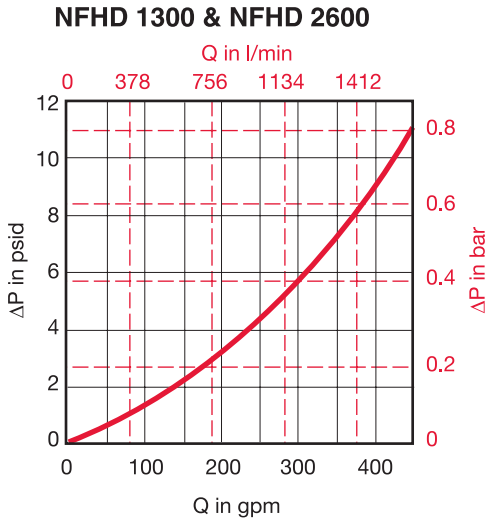
Housing Curve:

Pressure loss through housing is as follows:

$$\text{Housing } \Delta P = \text{Housing Curve } \Delta P \times \frac{\text{Actual Specific Gravity}}{0.86}$$

The curve below shows the clean ΔP through the Housing for a single filter. To determine Clean ΔP for manifolds with multiple housings, multiply the Clean ΔP curve value by the percentage value in the table.

ΔP Housing



NFHD System	Multiplier
5200	93%
7800	83%
10400	74%

Example

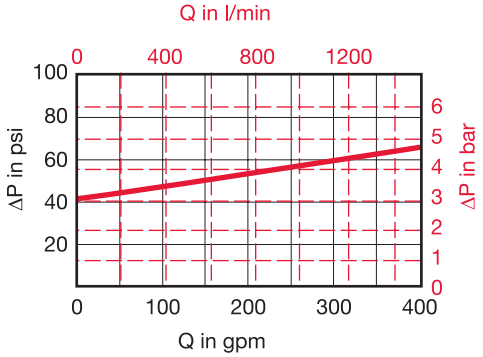
Conditions	
400 gpm flow	
NFHD 10400 manifold specified	= 9 psid
ΔP Curve	= 9 psid X 0.74
$\Delta P_{\text{Piping \& Housing}}$ 10400	= 6.7 psid
Fluid Specific Gr	= .86 psid
ΔP Total System = 6.7 psid ΔP Housing + ΔP Element	

Adjustments must be made for viscosity & specific gravity of the fluid to be used! *(see "Sizing HYDAC Filter Assemblies" in Section B - Overview)*

Bypass Valve Curve:

Curves shown are applicable for mineral oil with a specific gravity of 0.86. Differential pressure increases in proportion to the specific gravity of the fluid.

$$\Delta P \text{ Valve} = \Delta P \text{ Curve} \times \frac{\text{Actual Specific Gravity}}{0.86}$$



Element ΔP Calculations:

Sizing (K) Flow Factors below show the pressure drops across clean elements *(excluding housings and piping)*. (K) Factors are calculated from mineral based fluid at viscosity of 141 SUS and specific gravity of 0.86. To determine clean ΔP for NFH manifolds with more than one housing, use the (K) factors below and divide total flow rate by # towers per side.

$$\text{Element } \Delta P = \text{Elements (k) flow Factor} \times \frac{\text{total flow}}{\text{filter towers (on one side)}} \times \frac{\text{Actual Viscosity (SUS)}}{141} \times \frac{\text{Actual Sp Gravity}}{0.86} = 7.09 \text{ psid}$$

Example

Conditions	Selection - NFDH 10400 Filter
Lube system Viscosity of 1,000 SUS Specific gravity 0.86 400 gpm flow Low pressure drop essential 10 µm Optimicron® filter element	An NFHD 10400 filter *(with 4 towers)* gives an Adjusted Clean element ΔP as follows: Clean Assembly ΔP = ΔP Housing & ΔP Element Clean $\Delta P = \frac{400 \text{ gpm}}{4 \text{ towers}} \times 0.01 = 1.0$ psid Clean $\Delta P_{adj.} = 1.0 \times \frac{1000}{141} \times \frac{0.86}{0.86} = 7.09$ psid Clean Assembly ΔP = 6.7 psid (housing) + 7.09 psid (elements) = 13.8 psid

Element K Factors

$$\Delta P \text{ Elements} = \text{Elements (K) Flow Factor (From Tables Below)} \times \text{Flow Rate (gpm)} \times \frac{\text{Actual Viscosity (SUS)}}{141 \text{ SUS}} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Optimicron	...R...ON					
Size	1 µm	3 µm	5 µm	10 µm	15 µm	20 µm
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006

Stat-X	...R...XSX			
Size	3 µm	5 µm	10 µm	20 µm
1300 R XXX XSX	0.04	0.032	0.019	0.012
2600 R XXX XSX	0.02	0.016	0.01	0.006

ECOmicron	...R...ECON2			
Size	3 µm	5 µm	10 µm	20 µm
1300 R XXX ECON2	0.044	0.033	0.022	0.016
2600 R XXX ECON2	0.022	0.016	0.011	0.005

Betamicron/Aquamicron	...R...BN4AM	
Size	3 µm	10 µm
1300 R XXX BN4AM	0.088	0.033
2600 R XXX BN4AM	0.055	0.016

Aquamicron	...R...AM
Size	40 µm
1300 R 040 AM	0.026
2600 R 040 AM	0.013

Wire Mesh	...R...W/HC
Size	25, 50, 100, 200 µm
1300 R XXX W/HC	0.002
2600 R XXX W/HC	0.001

Polyester	...R...P/HC	
Size	10 µm	20 µm
1300 R XXX P/HC	0.004	0.002
2600 R XXX P/HC	0.002	0.001

All Element K Factors in psi / gpm.

Notes