

LOW PRESSURE FILTERS

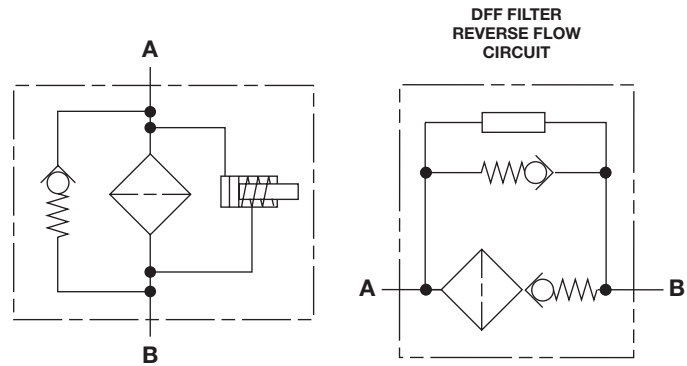
NFH Series

Modular Inline Return Line Filters

500 psi • up to 450 gpm



Hydraulic Symbol



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 (right side of Inlet Port) SAE 12 (3/4")
- Clogging Indicator for local and/or remote signals
- Easily banked in parallel (manifolded) for high viscosity applications.

Notes: This filter is configured with anR.... 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

Technical Specifications

Mounting Method	
NFH	2 mounting holes - filter head
NFH Manifold	Floor mounting brackets
Port Connection	
SAE DN 102 Flange Code 61 (<i>single tower</i>)	
SAE DN 102 (<i>multi-tower</i>)	
Flow Direction	
Inlet: Side Outlet: Bottom	
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)
<i>(Flow limited by 4" pipe size)</i>	
Housing Pressure Rating	
Max. Allowable Working Pressure	500 psi (34.5 bar)
Fatigue Pressure	500 psi (34.5 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 Temperature 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	
$\Delta P = 29$ psid (2 bar) -10% (<i>standard</i>)	
$\Delta P = 72$ psid (5 bar) -10% (<i>optional</i>)	
Bypass Valve Cracking Pressure	
$\Delta P = 43$ psid (3 bar) +10%	
$\Delta P = 87$ psid (6 bar) +10%	

Model Code

Filter Type NFH = In-line Return Line Filter

Element Media ON = Optimicron® BN/AM = Betamicon® Aquamicon®
ECON2 = ECOMicon® AM = Aquamicon®
W/HC = Wire Mesh P/HC = Polyester

Size 1300 = Single NFH 7800 = Manifold: 3 size 2600 Housings
2600 = Single NFH 10400 = Manifold: 4 size 2600 Housings
5200 = Manifold: 2 size 2600 Housings

Operating Pressure E = 500 psi (34 bar)

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

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

Type of ΔP Clogging Indicator A, BM, C, D

Type Number 1

Modification Number (latest version always supplied)

Port Configuration 16 = SAE-64, (4") Code 61 Flange

Flow Path (facing connecting manifold)
(omit) = Sizes 1300 and 2600 only C = Left inlet, Right outlet
A = Left inlet, Left outlet D = Right inlet, Left outlet (sizes 5200 - 10400 only)
B = Right inlet, Right outlet (sizes 5200 - 10400 only)

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
SO263 = Modification of elements for Skydrol or HYJET phosphate ester fluids
L24, L48, L110, L220 = Lamp for D-type clogging indicator (LXX, XX = voltage)
T100 = Indicator Thermal Lockout, 100°F (C and D only)
SFREE = Element specially designed to minimize electrostatic charge generation
cRUus = Electrical Indicator with underwriter's recognition
SO376 = Modification of ON and W/HC elements for HFA, HFB, HFC, and HFD flame retardant liquids
SO882 = Quality Protection Design

Replacement Element Model Code

Size 2600 R 005 ON / V
1300, 2600

Type R

Filtration Rating (micron) 1, 3, 5, 10, 15, 20 = ON 3, 5, 10, 20 = XSX
3, 5, 10, 20 = ECON2 3, 10 = BN4AM
40 = AM 10, 20 = P/HC
25, 50, 100, 200 = W/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)
SO882 = (same as above)

Clogging Indicator Model Code

Indicator Prefix VM 2 C . X / V
VM = G 1/2 3000 psi

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

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

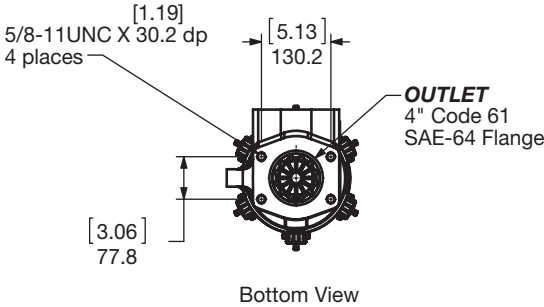
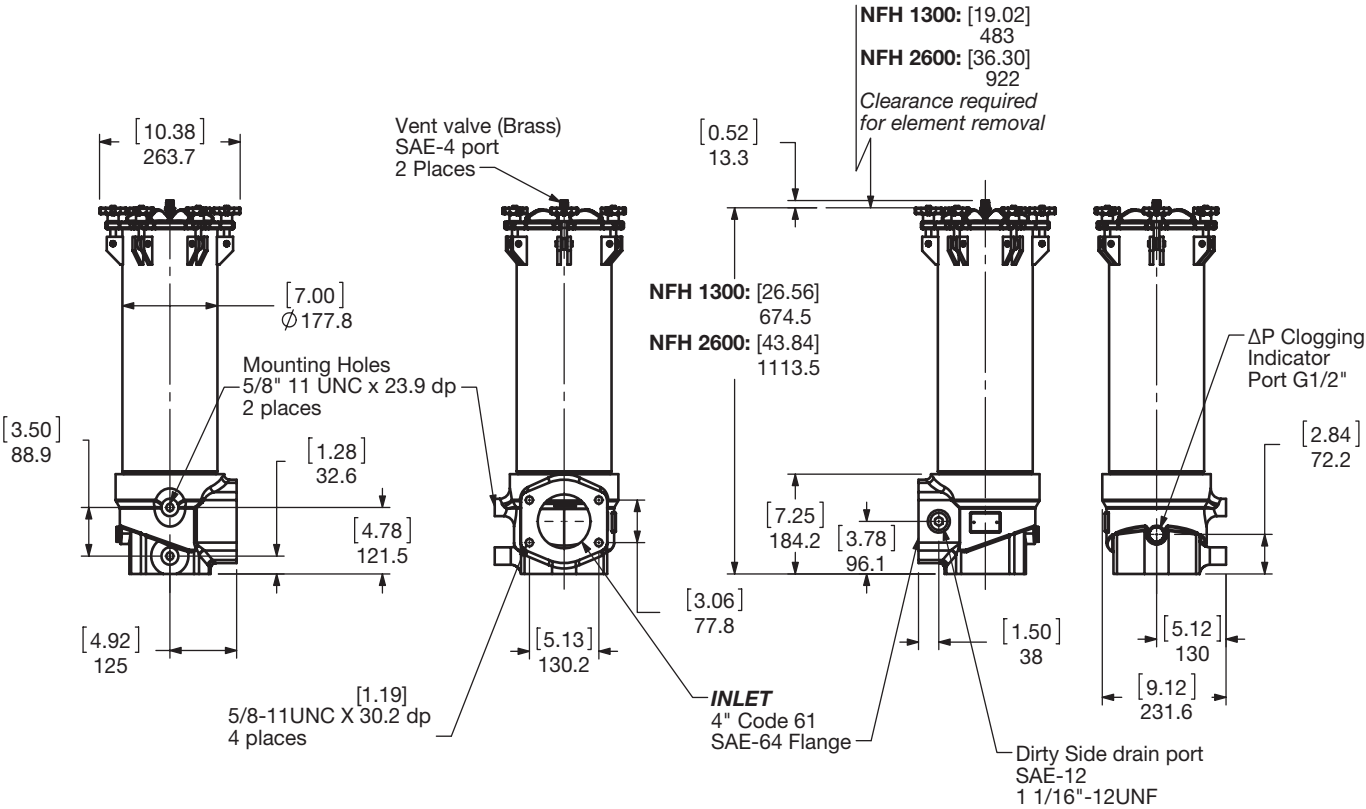
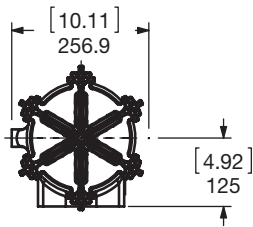
Underwriters Approval (VM, VD types C, D, J, and J4 only)
cRUus = Electrical Indicator with underwriter's recognition

(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

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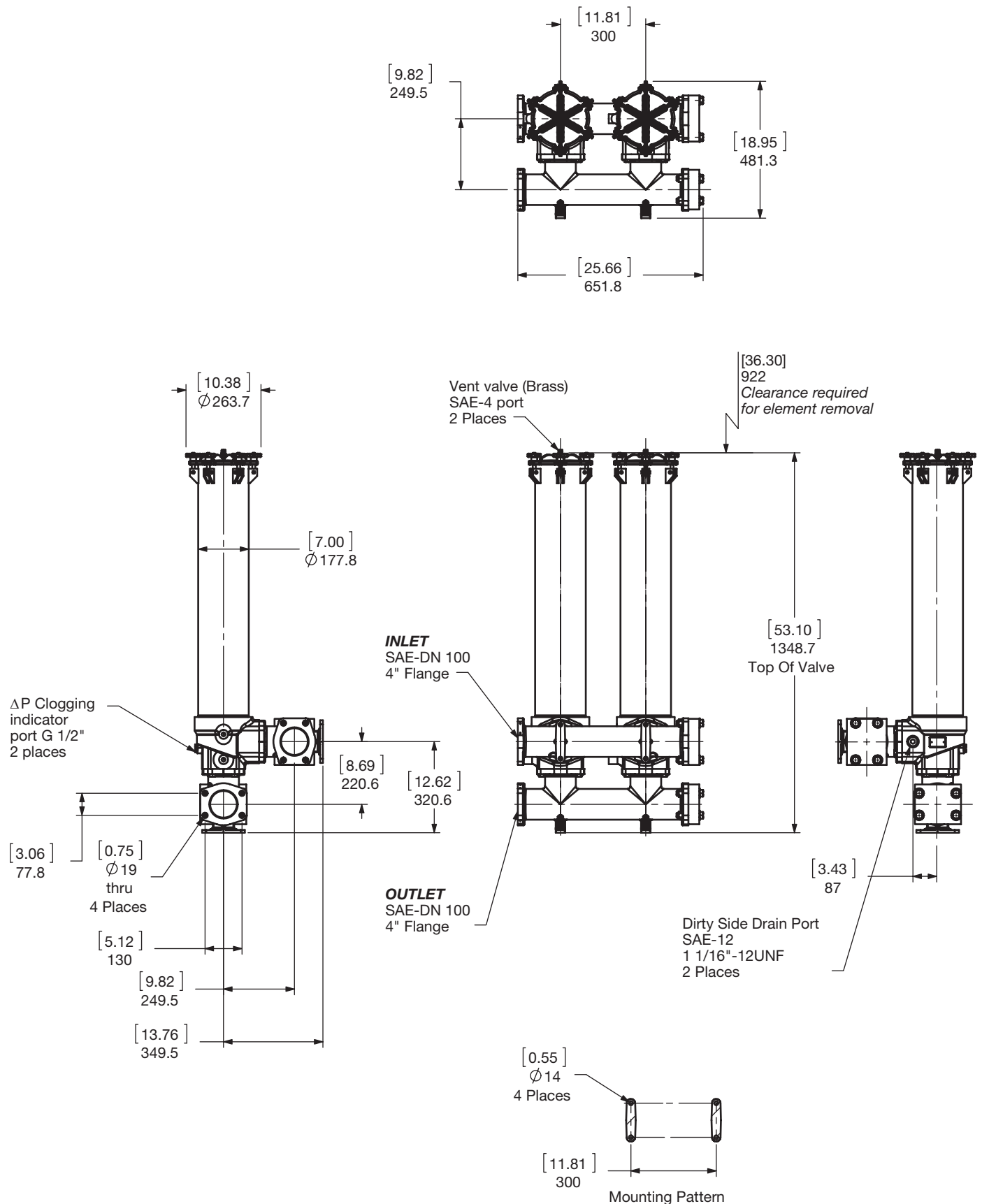
Dimensions
NFH 1300 / 2600



Size	1300	2600
Weight (lbs.)	87.1	115.5

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 NFH 5200

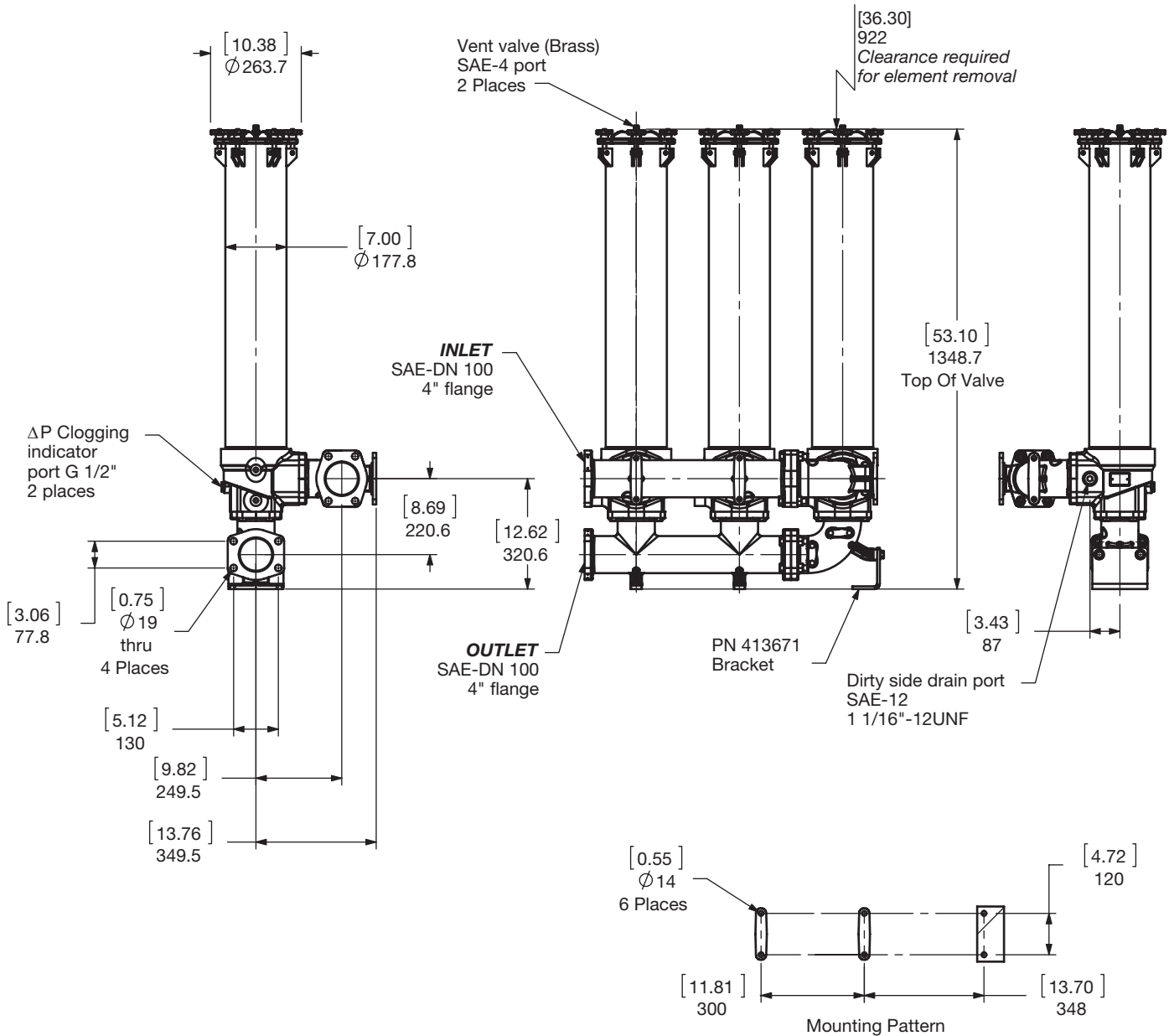
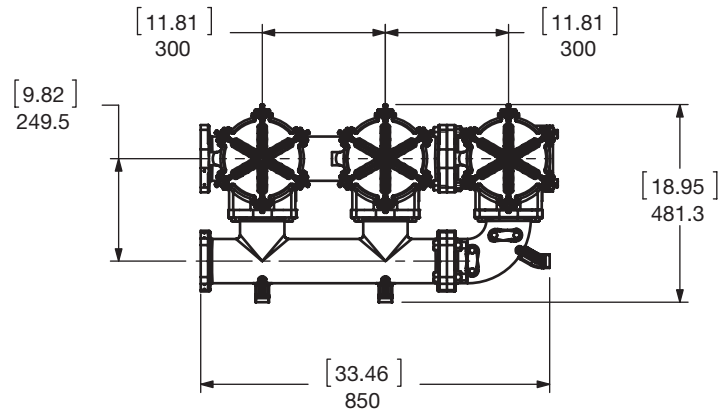


Size	5200
Weight (lbs.)	356

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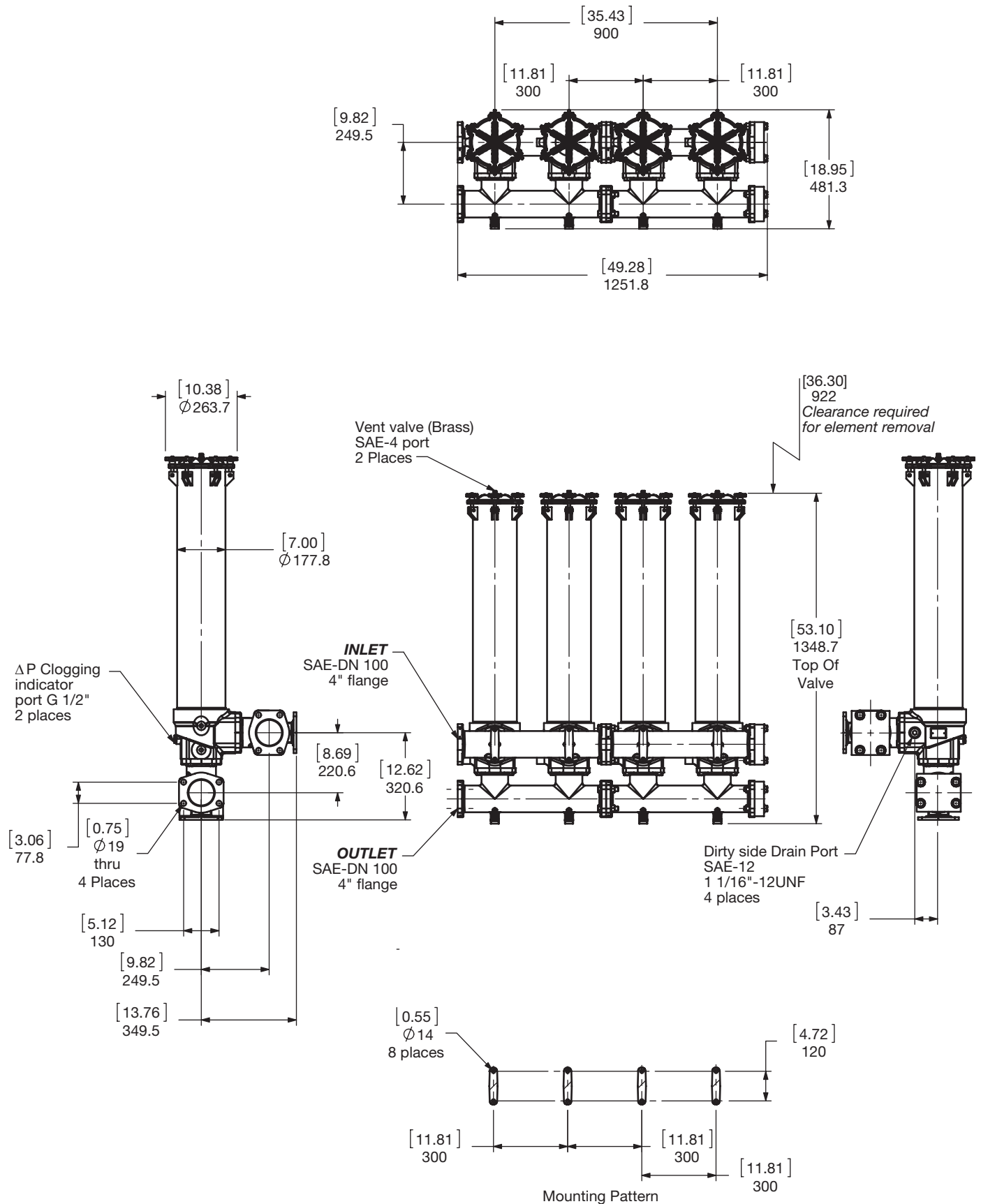
Dimensions NFH 7800



Size	7800
Weight (lbs.)	477.5

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 NFH 10400



Size	10400
Weight (lbs.)	684

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.

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Sizing Information

Total pressure loss through the filter is as follows:

Assembly ΔP = Housing ΔP + Element ΔP

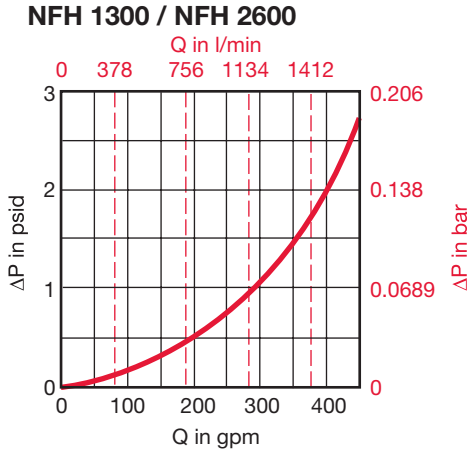
Housing Curve:

Pressure loss through housing is as follows:

Housing ΔP = Housing Curve ΔP x $\frac{\text{Actual Specific Gravity}}{0.86}$

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

ΔP Housing



NFH System	Multiplier
5200	73%
7800	61%
10400	48%

Example

Conditions
400 gpm flow NFH 5200 manifold specified ΔP Curve = 2 psid ΔP 5200 = 2 psid X 0.73 = 1.5 psid <small>Piping & Housing</small>
ΔP Total System = 1.5 psid + ΔP Element

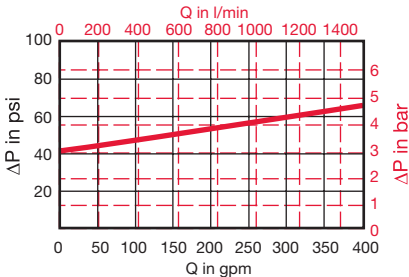
Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

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.

ΔP Valve = ΔP Curve x $\frac{\text{Actual Specific Gravity}}{0.86}$

1300 / 2600 Bypass Valve



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 appropriate sized single element (K) factor and multiply (total assembly flow rate divided by the number of housings in the manifold), then correct for viscosity.

Example 1: Lube System

Conditions
Viscosity = 500 SUS @ 120°F Specific gravity = 0.86 Flow = 75 gpm Low pressure drop essential K Factor = 10 μm Optimicron® filter element
Selection - NFH 2600 Filter
An NFH 2600 filter gives an Adjusted Clean Element ΔP as follows: Clean ΔP = 75 gpm x 0.01 = 0.75 psid Clean ΔP _{adj.} = 0.75 x $\frac{500}{141}$ x $\frac{0.86}{0.86}$ = 2.7 psid
Housing ΔP = "0" (negligible)

Example 2: System Return Filter

Conditions
Viscosity = ISO 68 Fluid 220 SUS @ 120°F Specific gravity = 0.86 Flow = 350 gpm 3μm Filtration (depth) β (beta) = 1000 K Factor = 3 μm Optimicron® filter element = 0.04
Selection - NFH 7800 Filter
Element ΔP = (350 ÷ 3 housings) x 0.04 x $\frac{220}{141}$ x $\frac{0.86}{0.86}$ = 7.28 psid
Housing ΔP = 1.05 (curve) x 0.61 x $\frac{0.86}{0.86}$ x = 0.64 psid
Assembly ΔP = 7.28 psid + 0.64 psid = 7.92 psid

