

FSLD

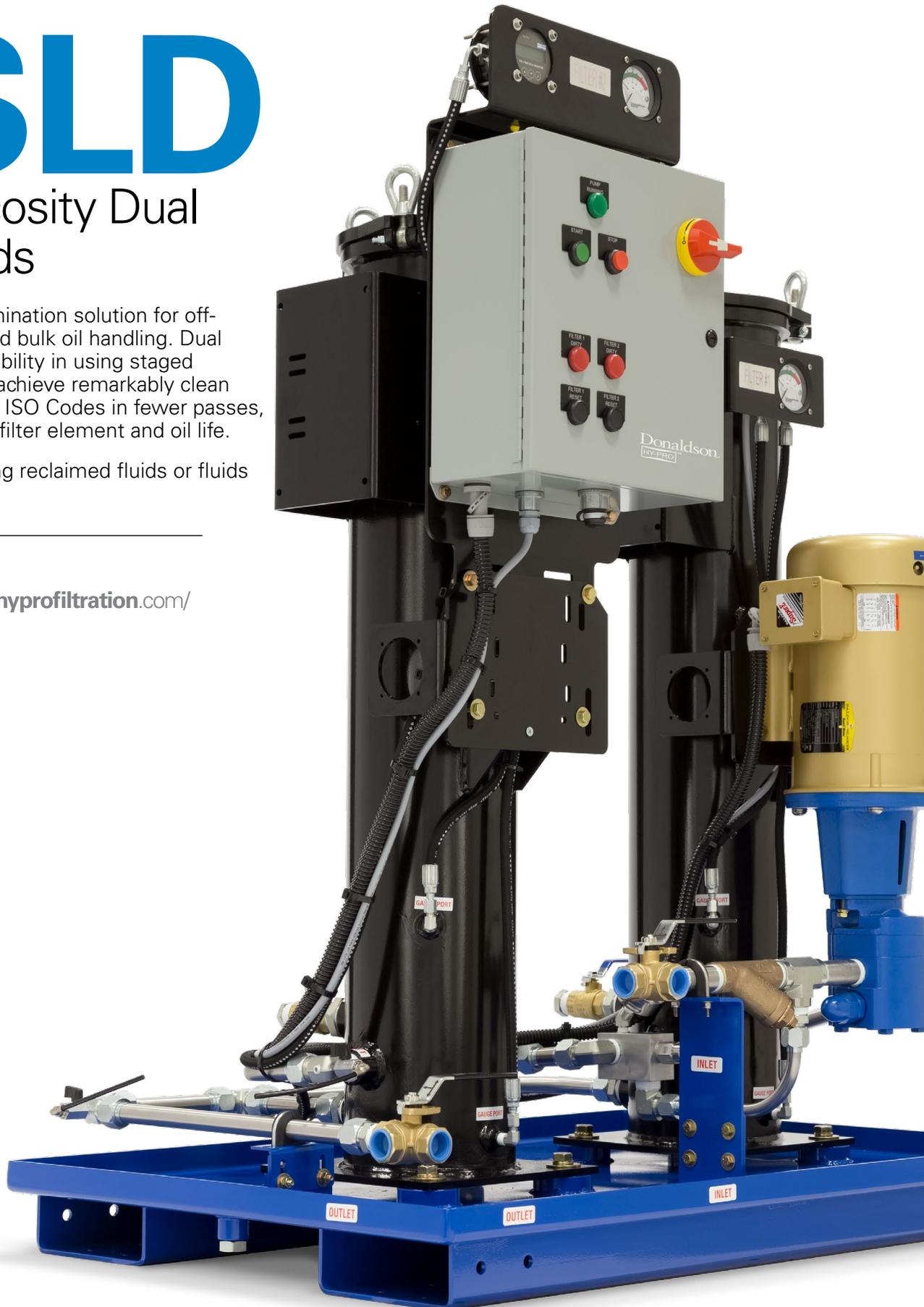
High Viscosity Dual Filter Skids

A dedicated contamination solution for off-line conditioning and bulk oil handling. Dual housings allow flexibility in using staged element ratings to achieve remarkably clean fluids and hit target ISO Codes in fewer passes, all while extending filter element and oil life.

Ideal for conditioning reclaimed fluids or fluids with high dirt load.

Donaldson.
HY-PRO™

hyprofiltration.com/



Dynamic duo.

Combine a number of media options in the dual FSL filter housings to maximize single pass efficiency and achieve lower ISO Codes even faster than you thought possible.

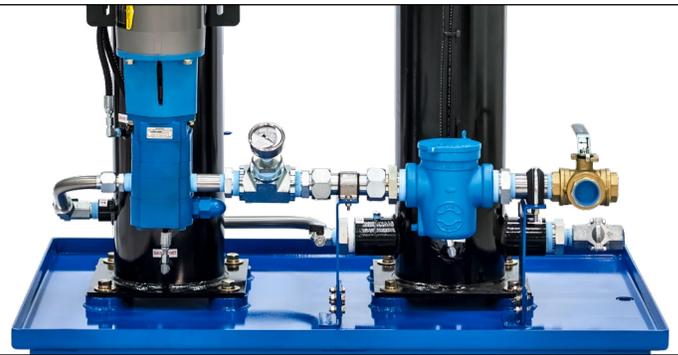


Filtration starts with the filter(s).

The FSLD's dual oversized coreless filter elements deliver lower ISO Codes over a long element lifespan to ensure low disposal impact, simultaneously reducing your environmental footprint and your bottom line. To top it off, select elements come standard with an integral zero-leak bypass, giving you time back from unnecessary gearbox rebuilds and letting you focus on what really matters.

Engineered for Industrial use.

Rugged construction and attention to the smallest of details come together remarkably so that nothing holds you or your equipment back. The standard spill retention pan and cast iron pump with internal relief mean you get the power and durability you want with the safety you have to have. To top it off, the standard 3-way inlet valve allows you to add new oil through the filter to stop contamination before it can ever enter your system.



Make your filtration count.

With the optional filter bypass line, cold starts and element change outs become easier than ever. Add to that the PM-1 Particle Monitor for real time cleanliness data and watch your ISO Codes drop like you'd never believe.



Setting the new standard.

Every FSLD comes standard with sample ports in the proper locations to arm you with access to consistently accurate system conditions. And with true differential pressure gages, you'll always know exactly how well your filtration is performing.



Completely customizable.

Every FSLD can be tailored specifically to your application whether you're dealing with high viscosities, cold weather, or temperature sensitive components so you get the perfect solution to your contamination problems.



FSLD Reference Guide

FSLD10 model with PM-1 option shown

Filter #2 true green to red ΔP gauge

Integrated PM-1 Particle Monitor

Top loading filter housing with secure swivel bolts

Air bleed valve

Machine E-stop

Machining running indicator light

Control panel

Filter #1 true green to red ΔP gauge

Dirty filter indicator lights

Electric motor

Pressure gauge

Flow control needle valve

Pressure gauge

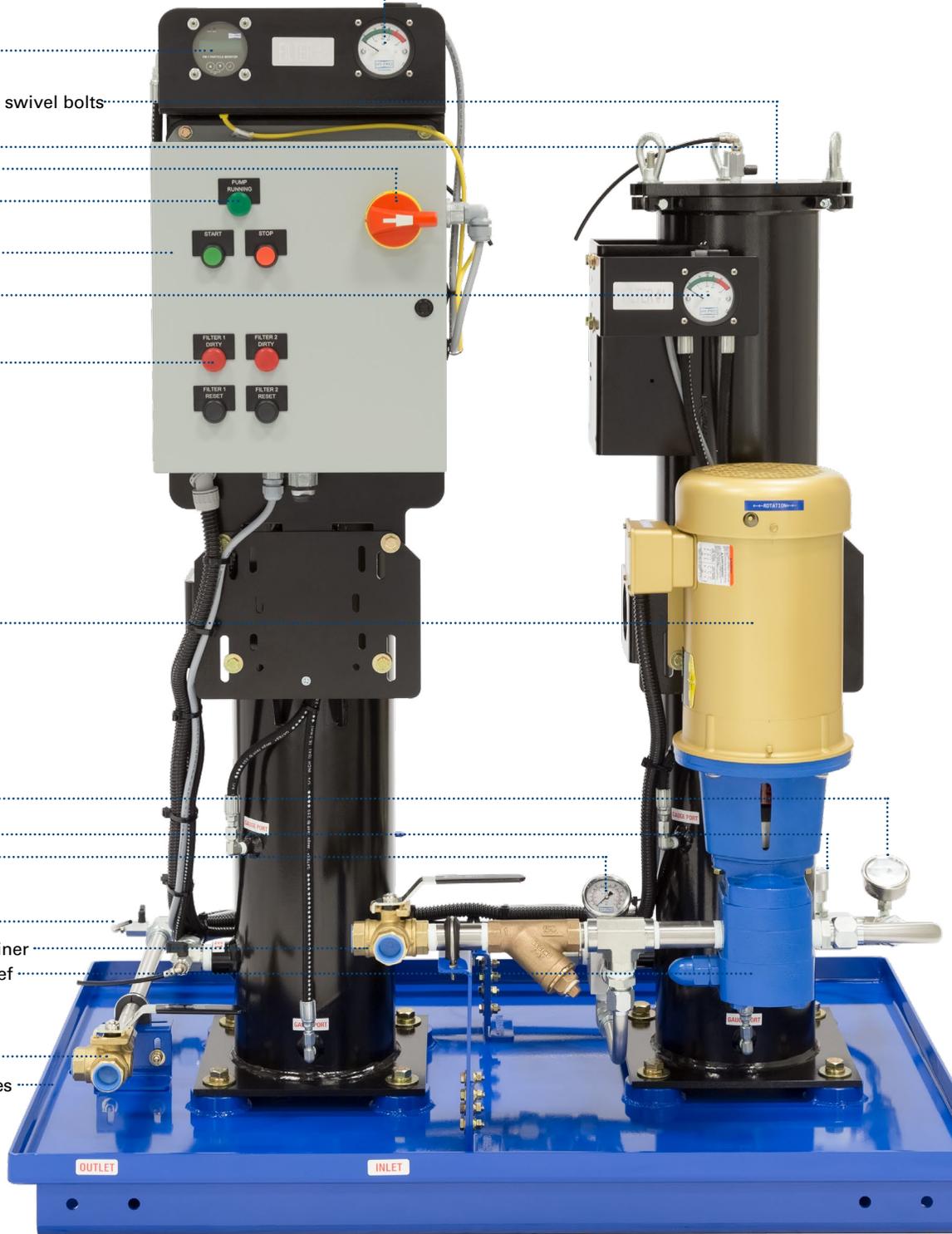
Outlet sample port

System inlet with 3-way valve + Y-strainer

Cast iron gear pump with internal relief

System outlet with 3-way valve

Powder coated steel tray with fork guides



Filter Sizing Guidelines

Filter Sizing Guidelines and Viscosity Conversion

Effective filter sizing requires consideration of flow rate, viscosity (operating and cold start), fluid type and degree of filtration. When properly sized, bypass during cold start can be avoided/minimized and optimum element efficiency and life achieved. The filter assembly differential pressure values provided for sizing differ for each media code, and assume 32 cSt (150 SUS) viscosity and 0.86 fluid specific gravity. Use the following steps to calculate clean element assembly pressure drop.

Calculate ΔP coefficient for actual viscosity

Using Saybolt Universal Seconds (SUS)

$$\Delta P \text{ Coefficient} = \frac{\text{Actual Operating Viscosity}^1 \text{ (SUS)}}{150} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Using Centistokes (cSt)

$$\Delta P \text{ Coefficient} = \frac{\text{Actual Operating Viscosity}^1 \text{ (cSt)}}{32} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Calculate actual clean filter assembly ΔP at both operating and cold start viscosity

$$\text{Actual Assembly Clean } \Delta P = \text{Flow Rate} \times \frac{\Delta P \text{ Coefficient (from calculation above)}}{\text{Assembly } \Delta P \text{ Factor (from sizing table)}}$$

Sizing recommendations to optimize performance and permit future flexibility

- To avoid or minimize bypass during cold start the actual assembly clean ΔP calculation should be repeated for start-up conditions if cold starts are frequent.
- Actual assembly clean ΔP should not exceed 10% of bypass ΔP gauge/indicator set point at normal operating viscosity.
- If suitable assembly size is approaching the upper limit of the recommended flow rate at the desired degree of filtration consider increasing the assembly to the next larger size if a finer degree of filtration might be preferred in the future. This practice allows the future flexibility to enhance fluid cleanliness without compromising clean ΔP or filter element life.
- Once a suitable filter assembly size is determined consider increasing the assembly to the next larger size to optimize filter element life and avoid bypass during cold start.
- When using water glycol or other specified synthetics we recommend increasing the filter assembly by 1~2 sizes.

FSLD Filter Sizing Guidelines

Filter Sizing¹

Filter assembly clean element ΔP after actual viscosity correction should not exceed 10% of filter assembly bypass setting. See previous page for filter assembly sizing guidelines & examples. For applications with extreme cold start condition contact Donaldson Hy-Pro for sizing recommendations.

ΔP Factors¹

Length	Units	Media	05M	1M	3M	6M	10M	16M	25M	**W
		VTM								
16/18	psid/gpm	0.063	0.047	0.046	0.039	0.030	0.027	0.027	0.026	0.005
	bard/lpm	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000
36/39	psid/gpm	0.044	0.033	0.032	0.027	0.021	0.019	0.019	0.018	0.003
	bard/lpm	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000

Length	Units	Media	3A	6A	10A	16A	25A
		1A					
16/18	psid/gpm	0.051	0.043	0.034	0.030	0.030	0.028
	bard/lpm	0.001	0.001	0.001	0.001	0.001	0.001
36/39	psid/gpm	0.036	0.030	0.024	0.021	0.021	0.020
	bard/lpm	0.001	0.001	0.000	0.000	0.000	0.000

¹Max flow rates and ΔP factors assume $\beta = 150$ SUS, 32 cSt. See filter assembly sizing guideline for viscosity conversion formula.

FSLD Specifications

Dimensions¹	Height 55" (139 cm)	Length 48" (121 cm)	Width 32" (81 cm)	Approximate Weight 484 lbs (219 kg)
Connections	Inlet with 3-Way Valve FSLD05-FSLD10: 1" FNPT FSLD20-FSLD30: 1.5" FNPT		Outlet FSLD05-FSLD10: 1" FNPT FSLD20-FSLD30: 1.25" FNPT	
Operating Temperature	Fluid Temperature 30°F to 225°F (0°C to 105°C)		Ambient Temperature -4°F to 104°F (-20C to 40C)	
Materials of Construction	Housings Carbon steel with industrial coating	Tray Carbon steel with industrial coating		
Electric Motor	TEFC, 56-215 frame 0.5 - 7.5 HP, 900 - 1750 RPM			
Motor Starter	MSP (motor starter/protector) in an IP55, enclosure with short circuit and overload protection.			
Pump	Cast iron, positive displacement gear pump with internal relief. Maximum pressure on pump inlet 15 psi (1 bar). Consult factory for higher pressures.			
Pump Bypass	Full bypass at 150 psi (10 bar) ²			
Pneumatic Option Air Consumption	~40 cfm @ 80 psi ³			
Media Description	M G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids. $\beta_{x(c)} \geq 4000$	A G8 Dualglass high performance media combined with water removal scrim. $\beta_{x(c)} \geq 4000$	W Stainless steel wire mesh media $\beta_{x(c)} \geq 2$ ($\beta_x \geq 2$)	VTM $\beta_{0.9(c)} \geq 4000$ particulate, insoluble oxidation by-product and water removal media
Replacement Elements	To determine replacement elements, use corresponding codes from your equipment part number:			
	Element Type Code	Filter Element Part Number	Example	
	5	HP105L[Length Code] – [Media Selection Code][Seal Code]	HP105L36–6AB	
	6	HP106L[Length Code] – [Media Selection Code][Seal Code]	HP106L18–10MV	
	7	HP107L[Length Code] – [Media Selection Code][Seal Code]	HP107L36–VTM710V	
	8X	HP8314L[Length Code] – [Media Selection Code][Seal Code]	HP8314L39–25WV	
	82	HP8314L[Length Code] – [Media Selection Code][Seal Code]	HP8314L16–12MB	
	85	HP8314L[Length Code] – [Media Selection Code][Seal Code]	HP8314L39–16ME–WS	
Viscosity	2-5000 cSt ⁴			
Fluid Compatibility	Petroleum and mineral based fluids, #2 diesel fuels (standard). For specified synthetics contact factory for compatibility with fluorocarbon seal option. For phosphate ester (P9) or skydrol fluid (S9) compatibility select fluid compatibility from special options.			
Hazardous Environment Options	Select pneumatic powered unit (Power Option 00) or explosion proof NEC Article 501, Class 1, Division 1, Group D. Call for IEC, Atex or other requirements. If Explosion Proof option (X--) selected, no electrical cord or cord reel will be included.			

¹Dimensions & weights are approximations taken from base model and will vary according to options chosen.

²10 GPM pump is rated for intermittent duty only at pressures above 100 psi. Continual operation with dual clogged filters resulting in operating pressures over 100 psi will reduce pump life and/or cause premature pump failure.

³Air consumption values are estimated maximums and will vary with regulator setting.

⁴When sized and installed appropriately. Contact factory for applications above 800 cSt for sizing requirements.

FSLD Part Number Builder

FSLD - -

Flow Rate Flow Type Element Type Element Length Indicator Power Options Special Options Media 1 Media 2 Seal

Flow Rate*	05	0.5 gpm (1.7 lpm)	900 RPM (50Hz) / 1200 RPM (60Hz)	10¹	10 gpm (37.9 lpm)	1450 RPM (50Hz) / 1750 RPM (60Hz)
	1	1 gpm (3.7 lpm)	1450 RPM (50Hz) / 1750 RPM (60Hz)	20	20 gpm (75.7 lpm)	1450 RPM (50Hz) / 1750 RPM (60Hz)
	2	2 gpm (7.5 lpm)	1450 RPM (50Hz) / 1750 RPM (60Hz)	30	30 gpm (114 lpm)	1450 RPM (50Hz) / 1750 RPM (60Hz)
	5	5 gpm (18.9 lpm)	1450 RPM (50Hz) / 1750 RPM (60Hz)			

Flow Type	D²	Duplex
	P²	Parallel
	S	Series

Element Type	5	HP105 – no bypass	8X	HP8314 – no bypass
	6	HP106 – 25 psid (1.7 bard) integral element bypass	82	HP8314 – 25 psid (1.7 bard) integral housing bypass
	7	HP107 – 50 psid (3.4 bard) integral element bypass	85	HP8314 – 50 psid (3.4 bard) integral housing bypass

Element Length	18³	L18 single length filter housing and coreless element	16³	L16 single length filter housing and coreless element
	36³	L36 single length filter housing and coreless element	39³	L39 single length filter housing and coreless element

ΔP Indicator	D	22 psid visual gages + electric switches	H	65 psid visual gages + electric switches (elements 5 or 8X only)
	E	22 psid visual gages	J	65 psid visual gages (elements 5 or 8X only)
	F	45 psid visual gages + electric switches	P	2 pressure gages (industrial liquid filled)
	G	45 psid visual gages	X	None (ports plugged)

Power Options Contact factory for options not listed	60 Hz		50 Hz		Pneumatic	
	12⁴	120 V ac, 1P	11⁴	110 V ac, 1P	00	Pneumatically driven air motor & PD pump. FRL & flow meter included.
	22	208-230 V ac, 1P	21	220 V ac, 1P		
	23	208-230 V ac, 3P	40	380-440 V ac, 3P		
	46	460-480 V ac, 3P	52	525 V ac, 3P		
	57	575 V ac, 3P				

Explosion proof - Class 1, Division 1, Group D per NEC 501 – Ready for outdoor use

X__ Add X prefix to power option listed above. Not available with (00) Pneumatic Option.

Special Options	A	Air cooled heat exchanger (consult factory)	O⁵	On-board PM-1 particle monitor & clean oil indicator light
	B	Complete filter bypass line	P9⁶	Phosphate ester fluid compatibility modification
	C	CE marked for machinery safety directive 2006/42/EC	R	Spill retention pan with wheels (industrial coated steel)
	D⁵	High filter ΔP auto shutdown	S⁷	All wetted components 303 or higher stainless steel
	E	100 mesh cast iron basket strainer	S9⁸	Skydrol fluid compatibility modification
	F	Filter element ΔP gauge with tattle tale follower needle	U	CUL and/or CSA marked starter enclosure for Canada
	J	Add pressure gauge between pump & filter assembly	V	Lifting eye kit
	K	HP75L8-149W Spin-On suction strainer	W	Automatic air bleed valve
	L⁵	High filter element ΔP indicator light	Y	VFD variable speed motor frequency control
	M	Total system flow meter (120 cSt max)	Z	On site start-up training

Media Selection	G8 Dualglass		G8 Dualglass + water removal		Stainless wire mesh	
	05M	β _{0.9(c)} ≥ 4000	3A	β _{3(c)} ≥ 4000	25W	25μ nominal
	1M	β _{3(c)} ≥ 4000	6A	β _{6(c)} ≥ 4000	40W	40μ nominal
	3M	β _{4(c)} ≥ 4000	10A⁹	β _{11(c)} ≥ 4000	74W	74μ nominal
	6L	β _{6(c)} ≥ 4000	25A	β _{22(c)} ≥ 4000	149W	149μ nominal
	10M⁹	β _{11(c)} ≥ 4000				
	16M	β _{16(c)} ≥ 4000				
25M	β _{22(c)} ≥ 4000					

VTM

VTM710¹⁰ β_{0.9(c)} ≥ 4000 particulate, insoluble oxidation by-product and water removal media

Bag filter

BAG¹¹ #2 size bag housing 25μ nominal

Seals	B	Nitrile (Buna)
	V	Fluorocarbon
	E-WS	EPR seals + stainless steel support mesh

¹Nominal flow rates at 60 Hz motor speeds.

²Has a max viscosity 200cSt limitation with 1P electrical option, and not available with "O" special option.

³When selected, omit Media 2 option from part number builder. Element chosen will be supplied for both filter housings.

⁴Compatibility will be based on Element Type selection. For elements HP105, HP106, and HP107, use Length code 36. Length code 39 only compatible with HP8314.

⁵High amp draw on 10 GPM models. Estimated FLA 18. See Appendix for details.

⁶Requires ΔP Indicator option with electric switch selected (options D, F, H).

⁷"O" Option not available with "X__" or "Y" options. "O" Option includes "J" option, do not add to part number. "O" Option not available with 30 GPM flow rate.

⁸When selected, must be paired with Seal option "V." Contact factory for more information or assistance in fluid compatibility.

⁹With exception to cast iron gear pump.

¹⁰When selected, must be paired with Seal option "E-WS." Contact factory for more information or assistance in fluid compatibility.

¹¹For elements HP8314, use 12M or 12A for respective media code in place of 10M or 10A.

¹²Only available on HP107 series elements. Flow rate should not exceed 16 gpm (60 lpm) for HP107L36-VTM710* elements and 8 gpm (30 lpm) for HP107L18-VTM710* elements.

¹³Available in series 1 housing only. Replaces Element Type in series 1 housing.



Filtration starts with the filter.

Lower ISO Codes: Lower Total Cost of Ownership Donaldson Hy-Pro filter elements deliver lower operating ISO Codes so you know your fluids are always clean, meaning lower total cost of ownership and reducing element consumption, downtime, repairs, and efficiency losses.

DFE Rated Filter Elements DFE is Donaldson Hy-Pro's proprietary testing process which extends ISO 16889 Multi Pass testing to include real world, dynamic conditions and ensures that our filter elements excel in your most demanding hydraulic and lube applications.

Upgrade Your Filtration Keeping fluids clean results in big reliability gains and upgrading to Donaldson Hy-Pro filter elements is the first step to clean oil and improved efficiency.

Advanced Media Options DFE glass media maintaining efficiency to $\beta_{3(\text{cl})} > 4000$, Dualglass + water removal media to remove free and emulsified water, stainless wire mesh for coarse filtration applications, and Dynafuzz stainless fiber media for EHC and aerospace applications.

Delivery in days, not weeks From a massive inventory of ready-to-ship filter elements to flexible manufacturing processes, Donaldson Hy-Pro is equipped for incredibly fast response time to ensure you get your filter elements and protect your uptime.

More than just filtration Purchasing Donaldson Hy-Pro filter elements means you not only get the best filters, you also get the unrivaled support, training, knowledge and expertise of the Donaldson Hy-Pro team working shoulder-to-shoulder with you to eliminate fluid contamination.



Want to find out more? Get in touch.

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