

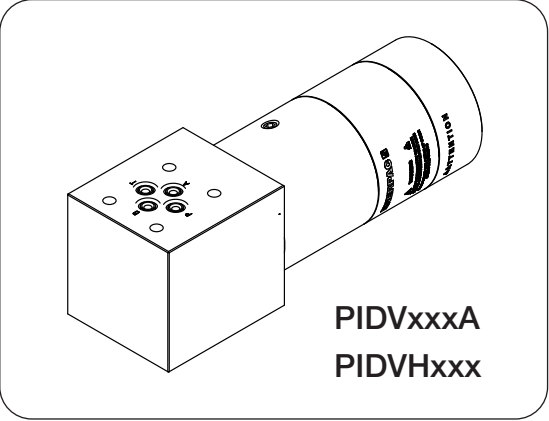
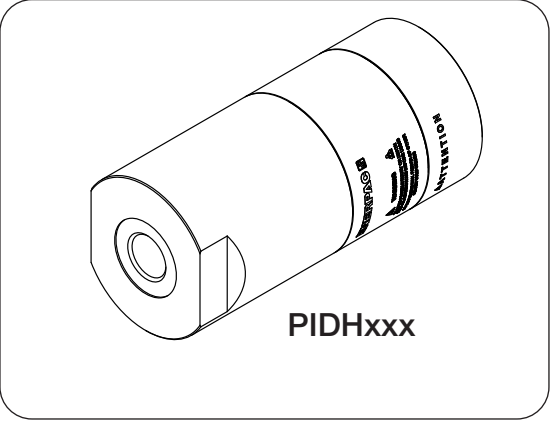
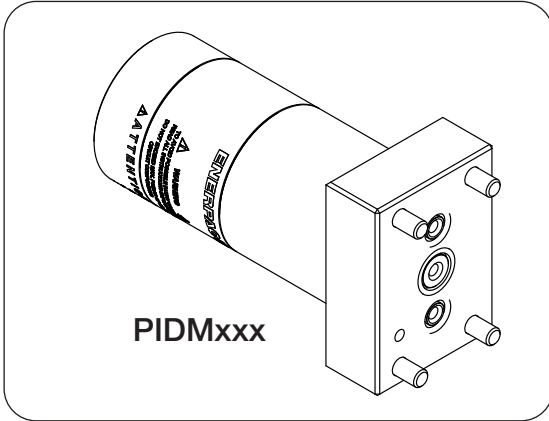
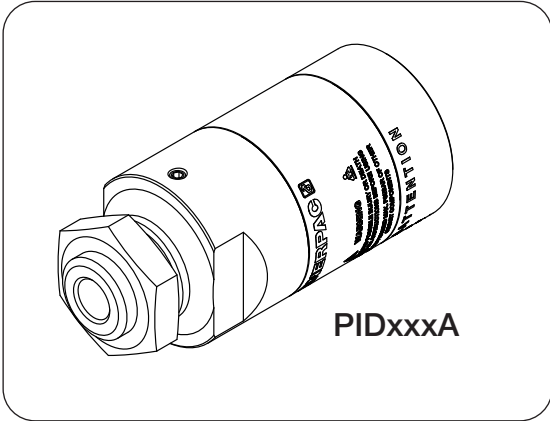
Hydraulic Oil-to-Oil Intensifiers PID Series

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 To reduce the risk of injury, user must read and understand this document before use.

ABOUT US

Enerpac is a global market leader in high pressure hydraulic tools, controlled force products, portable machining, on-site services and solutions for precise positioning of heavy loads. As a leading innovator with over a 100 year legacy, Enerpac has helped move and maintain some of the largest structures on earth. When safety and precision matters, elite professionals in industries such as aerospace, infrastructure, manufacturing, mining, oil & gas and power generation rely on Enerpac for quality tools, services and solutions. For additional information, visit www.enerpac.com.

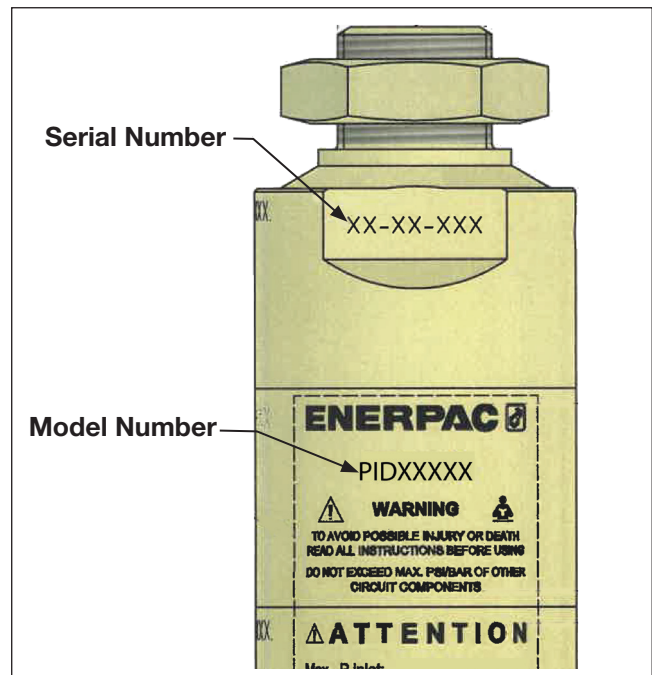
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WARRANTY

Refer to the Enerpac Global Warranty document for terms and conditions of the product warranty. Such warranty information can be found at www.enerpac.com.

PRODUCT MARKINGS

Refer to markings on intensifier housing for the model number, date code and other applicable information. Markings shown in graphic at right are typical, but will vary depending on model.



AVAILABLE LANGUAGES

An electronic copy of this document is available online in multiple languages:

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1.0 SAFETY

Read all instructions carefully. Follow all recommended safety precautions to avoid personal injury as well as damage to the product and/or damage to other property. Enerpac cannot be responsible for any damage or injury from unsafe use, lack of maintenance, or incorrect operation. Do not remove warning labels, tags, or decals. In the event that any questions or concerns arise, contact Enerpac or a local Enerpac distributor for clarification.

Save these instructions for future use.

Appropriate training in the safe use of workholding hydraulic systems and components is required prior to the installation and operation of the intensifier. If training is needed, contact your local Enerpac distributor or authorized service center for information about an Enerpac hydraulic safety training course.

This manual follows a system of safety alert symbols, signals, words, and safety messages to warn the user of specific hazards. Failure to comply with these warnings could result in death or serious personal injury, as well as damage to the equipment or other property.



The Safety Alert Symbol appears throughout this manual. It is used to alert you to potential physical injury hazards. Pay close attention to Safety Alert Symbols and obey all safety

messages that follow this symbol to avoid the possibility of death or serious injury.

Safety Alert Symbols are used in conjunction with certain Signal Words that call attention to safety messages or property damage messages and designate a degree or level of hazard seriousness. The Signal Words used in this manual are WARNING, CAUTION and NOTICE.

WARNING Indicates a hazardous situation that, if not avoided, could result in death or serious personal injury.

CAUTION Indicates a hazardous situation that, if not avoided, could result in minor or moderate personal injury.

NOTICE Indicates information considered important, but not hazard related (e.g. messages related to property damage). Please note that the Safety Alert Symbol will not be used with the signal word.

1.1 Hydraulic Safety Precautions

1.1.1 General Workholding Safety Precautions

WARNING Failure to observe and comply with the following precautions could result in death or serious personal injury. Property damage could also occur.

- Although hydraulic operation moves the control of the clamping fixture to an area of greater safety, operators must still remain alert and use common sense practises during their work.
- Use care when selecting components for the workholding application so that safe operation is ensured. Be certain that all components and devices are of adequate rated capacity to perform their intended functions. Do not exceed equipment ratings.

- Verify that all appropriate safety measures have been taken to avoid the risk of injury and property damage from your application or system.
- Be sure that all personnel involved with operating or servicing the workholding devices read and understand the information contained in the manuals included with these devices. Observe and follow all safety instructions and precautions contained in the manuals.
- Design the control units of power operated clamping systems to avoid inadvertent or unauthorized activation.
- Be sure that clamping cylinders and other similar workholding devices are properly positioned before clamping forces are applied.
- Maintain a safe distance from clamping elements and workpiece to avoid personal injury. Stay clear of pinch points. Keep your hands, feet and body away from the clamping area.
- Use mechanical devices and not fingers to hold a part in place until the clamping hydraulics are activated. Do not remove or disable the pressure relief valve.

NOTICE Hydraulic equipment must only be serviced by a qualified hydraulic technician. For repair service, contact the Enerpac authorized service center in your area.

1.1.2 Hydraulic Intensifier Safety Precautions (All PID Series Models)

WARNING Failure to observe and comply with the following precautions could result in death or serious personal injury. Property damage could also occur.

- Be sure that the hydraulic pump or system hydraulic power unit is turned off and disconnected from power source before beginning any work. Lockout and tag controls to prevent accidental startup as installation is being performed.
- Be sure that any hydraulic pressure in the circuit is completely relieved before loosening any hydraulic fittings or removing any hoses or components. All gauges must indicate zero (0) psi/bar. Be certain that no hydraulic hoses are stiff and that there are no other indications of trapped pressure within the system.
- Work with clean tools in clean surroundings, free of dust or dirt.
- Ensure that the intensifier installation is performed only by trained and qualified personnel, familiar with the setup and installation of hydraulic equipment.
- If unsure about safety, installation or adjustment procedures described in this manual, consult an experienced hydraulic systems engineer or technician, and if needed, the Enerpac Technical Service Department.
- Never exceed the maximum rated operating pressure of the intensifier. Never exceed the maximum pressure rating of other devices in the circuit. Refer to the tables in Section 2.0 of this manual for intensifier maximum operating pressures.

- Some PID Series intensifier models are capable of providing a maximum pressure above 5000 psi [350 bar]. Operation at pressures above 5000 psi [350 bar] requires the use of high pressure fittings. Contact Enerpac for additional details.
- Read, understand and follow all communicated safety precautions and related information included on the following pages of this manual.

1.2 Labels

Product information (decals, labels, symbols etc.) may be affixed to or printed on the intensifier housing. In some instances, these labels may advise the user of potentially hazardous situations. Always completely follow the communicated precautions and/or instructions.

2.0 SPECIFICATIONS AND PRODUCT DATA

2.1 Specifications (imperial)

Model No.	Mounting Style	Max Hyd. Pressure at Outlet *	Pressure Intensification Ratio	Inlet Pressure Range	Maximum Inlet Flow	Maximum Outlet Flow	Weight	Port Sizes	
		psi		psi	in ³ /min	in ³ /min		lb	Inlet & Return
PID321A	Inline	5000	3.2:1	290-1563	915	153	2.2	#4 SAE	#6 SAE
PID401A	Inline	5000	4.0:1	290-1250	854	122	2.2	#4 SAE	#6 SAE
PID501A	Inline	5000	5.0:1	290-1000	854	98	2.2	#4 SAE	#6 SAE
PID661A	Inline	5000	6.6:1	290-758	793	79	2.2	#4 SAE	#6 SAE
PID322A	Inline	9600*	3.2:1	290-3000	915	153	2.2	G1/4"	G1/4"
PID402A	Inline	11600*	4.0:1	290-2900	854	122	2.2	G1/4"	G1/4"
PID502A	Inline	11600*	5.0:1	290-2321	854	98	2.2	G1/4"	G1/4"
PID662A	Inline	11600*	6.6:1	290-1758	793	79	2.2	G1/4"	G1/4"
PIDH322	Inline	5000	3.2:1	290-1563	2136	305	8.14	G3/8"	G1/2"
PIDH432	Inline	5000	4.0:1	290-1163	2136	244	8.14	G3/8"	G1/2"
PIDH512	Inline	5000	5.0:1	290-980	2136	214	8.14	G3/8"	G1/2"
PIDH632	Inline	5000	6.6:1	290-794	2136	153	8.14	G3/8"	G1/2"
PIDV322A	D03/CETOP 3	5000	3.2:1	290-1563	915	153	5.5	---	---
PIDV402A	D03/CETOP 3	5000	4.0:1	290-1250	855	122	5.5	---	---
PIDV502A	D03/CETOP 3	5000	5.0:1	290-1000	855	98	5.5	---	---
PIDV662A	D03/CETOP 3	5000	6.6:1	290-758	795	79	5.5	---	---
PIDVH322	D03/CETOP 3	5000	3.2:1	290-1563	2449	397	13.2	---	---
PIDVH432	D03/CETOP 3	5000	4.3:1	290-1163	2449	305	13.2	---	---
PIDVH512	D03/CETOP 3	5000	5.1:1	290-980	2449	250	13.2	---	---
PIDVH632	D03/CETOP 3	5000	6.3:1	290-794	2449	208	13.2	---	---
PIDM322	Face Manifold	5000	3.2:1	290-1563	924	153	3.85	---	---
PIDM402	Face Manifold	5000	4.0:1	290-1250	855	122	3.85	---	---
PIDM502	Face Manifold	5000	5.0:1	290-1000	855	98	3.85	---	---
PIDM662	Face Manifold	5000	6.6:1	290-758	785	79	3.85	---	---

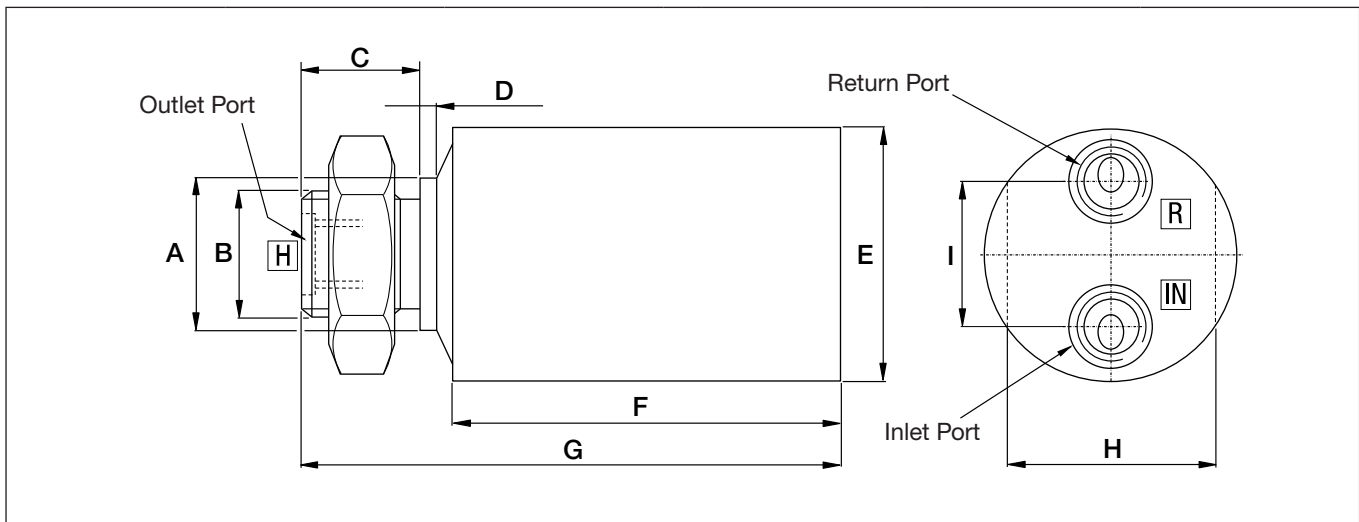
* Operating pressures above 5000 psi [350 bar] require high pressure fittings. Contact Enerpac for details.

2.2 Specifications (metric)

Model No.	Mounting Style	Max Hyd. Pressure at Outlet *	Pressure Intensification Ratio	Inlet Pressure Range	Maximum Inlet Flow	Maximum Outlet Flow	Weight	Port Sizes	
		bar		bar	lpm	lpm		Kg	Inlet & Return
PID321A	Inline	350	3.2:1	20-109	15	2.5	1.0	#4 SAE	#6 SAE
PID401A	Inline	350	4.0:1	20-87	14	2.0	1.0	#4 SAE	#6 SAE
PID501A	Inline	350	5.0:1	20-70	14	1.6	1.0	#4 SAE	#6 SAE
PID661A	Inline	350	6.6:1	20-53	13	1.3	1.0	#4 SAE	#6 SAE
PID322A	Inline	662*	3.2:1	20-207	15	2.5	1.0	G1/4"	G1/4"
PID402A	Inline	800*	4.0:1	20-200	14	2.0	1.0	G1/4"	G1/4"
PID502A	Inline	800*	5.0:1	20-160	14	1.6	1.0	G1/4"	G1/4"
PID662A	Inline	800*	6.6:1	20-121	13	1.3	1.0	G1/4"	G1/4"
PIDH322	Inline	350	3.2:1	20-109	35	5.0	3.7	G3/8"	G1/2"
PIDH432	Inline	350	4.0:1	20-81	35	4.0	3.7	G3/8"	G1/2"
PIDH512	Inline	350	5.0:1	20-69	35	3.5	3.7	G3/8"	G1/2"
PIDH632	Inline	350	6.6:1	20-56	35	2.5	3.7	G3/8"	G1/2"
PIDV322A	D03/CETOP 3	350	3.2:1	20-109	15	2.5	2.5	---	---
PIDV402A	D03/CETOP 3	350	4.0:1	20-87	14	2.0	2.5	---	---
PIDV502A	D03/CETOP 3	350	5.0:1	20-70	14	1.6	2.5	---	---
PIDV662A	D03/CETOP 3	350	6.6:1	20-53	13	1.3	2.5	---	---
PIDVH322	D03/CETOP 3	350	3.2:1	20-109	40	6.5	6.0	---	---
PIDVH432	D03/CETOP 3	350	4.3:1	20-81	40	5.0	6.0	---	---
PIDVH512	D03/CETOP 3	350	5.1:1	20-69	40	4.1	6.0	---	---
PIDVH632	D03/CETOP 3	350	6.3:1	20-56	40	3.4	6.0	---	---
PIDM322	Face Manifold	350	3.2:1	20-109	15	2.5	1.75	---	---
PIDM402	Face Manifold	350	4.0:1	20-87	14	2.0	1.75	---	---
PIDM502	Face Manifold	350	5.0:1	20-70	14	1.6	1.75	---	---
PIDM662	Face Manifold	350	6.6:1	20-53	13	1.3	1.75	---	---

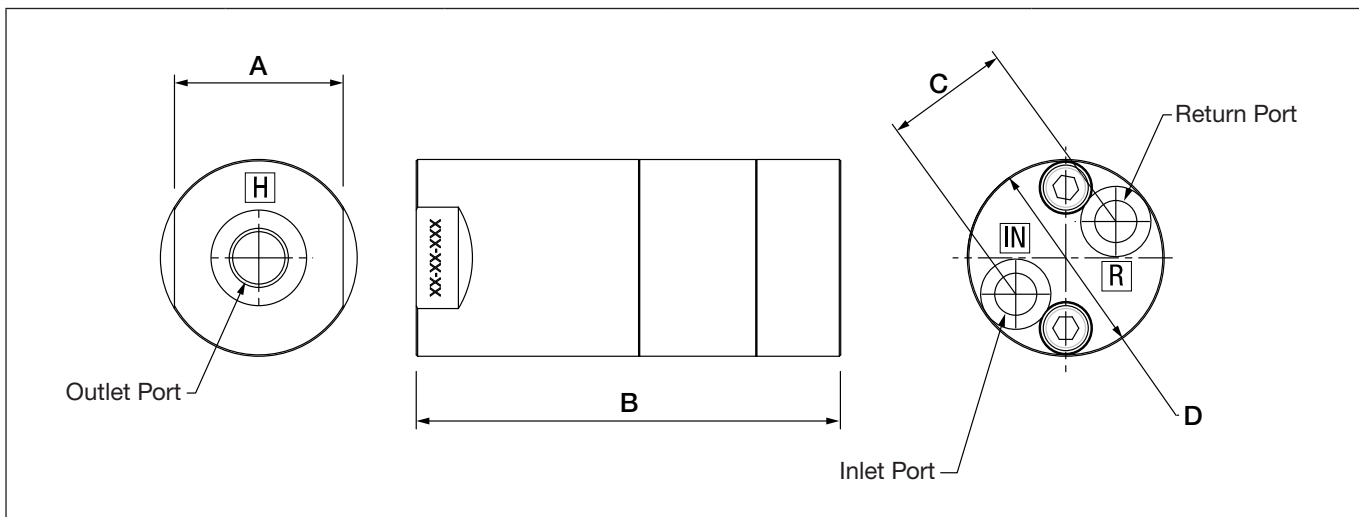
* Operating pressures above 350 bar [5000 psi] require high pressure fittings. Contact Enerpac for details.

2.3 External Dimensions & Port Locations - PIDxxxA Models



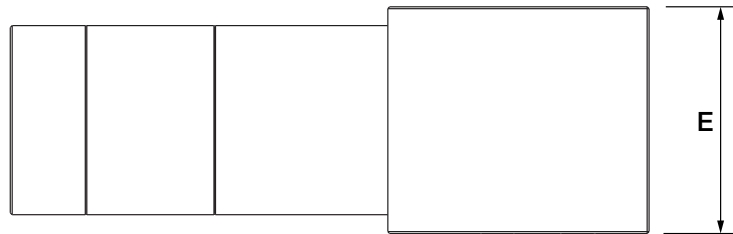
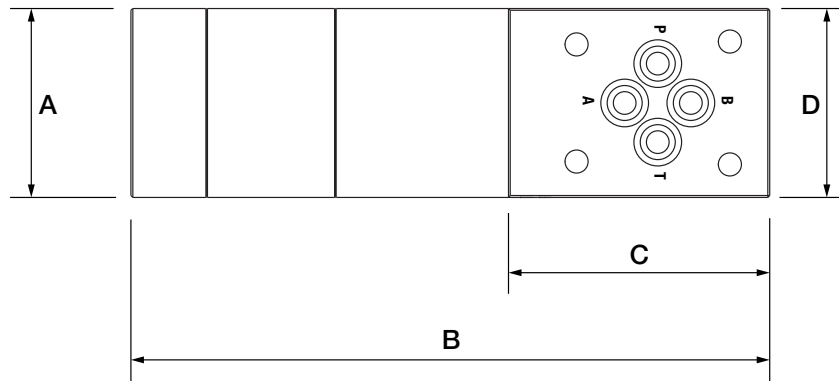
Item	Dimension or Port Size		Item	Dimension or Port Size	
	inch	mm		inch	mm
A	ø 1.17-1.18	ø 29.8-30.0	G	4.32-4.34	109.8-110.2
B	M24 x 1.5		H	1.61	40.9
C	0.74-0.76	18.8-19.2	I	1.09-1.10	27.8-28.0
D	0.09-0.11	2.3-2.7	Outlet Port [H]	#4 SAE or G-1/4" (varies by model)	
E	1.97-1.97	49.9-50.0	Inlet Port [IN]	#4 SAE or G-1/4" (varies by model)	
F	3.34-3.35	84.8-85.2	Return Port [R]	#6 SAE or G1/4" (varies by model)	

2.4 External Dimensions & Port Locations - PIDHxxx Models

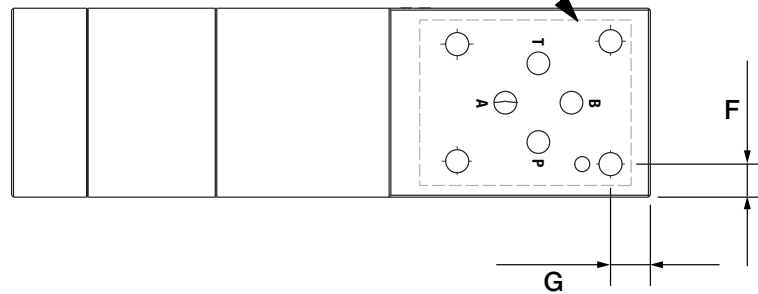


Item	Dimension		Item	Port Size
	inch	mm		
A	2.36	60.0	Outlet Port [H]	G-1/2"
B	5.93	150.5	Inlet Port [IN]	G-3/8"
C	1.73	44.0	Return Port [R]	G-3/8"
D	ø 2.76	ø 70.0		

2.5 External Dimensions & Port Locations - PIDVxxxA Models

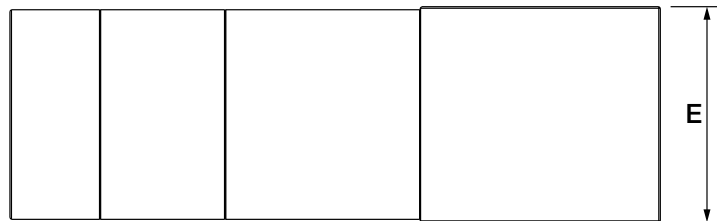
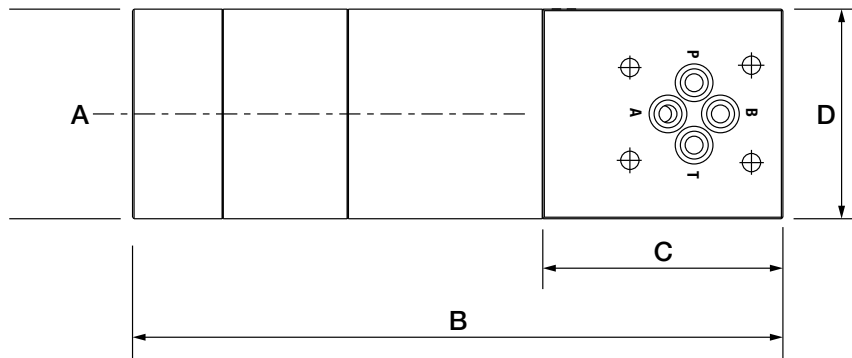


D03/CETOP 3 VALVE MOUNTING

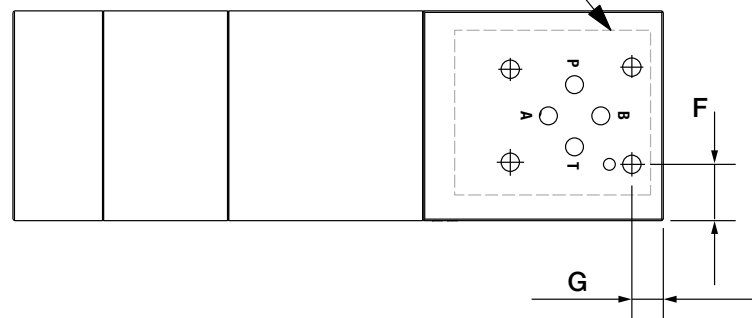


Item	Dimension		Item	Dimension	
	inch	mm		inch	mm
A	ø 1.97	ø 50.0	E	2.36	60.0
B	6.64	168.7	F	0.34	8.8
C	2.72	69.0	G	0.41	10.5
D	1.97	50.0	Ports: A (advance), B (retract), P (pump) and T (reservoir)		

2.6 External Dimensions & Port Locations - PIDVHxxx Models

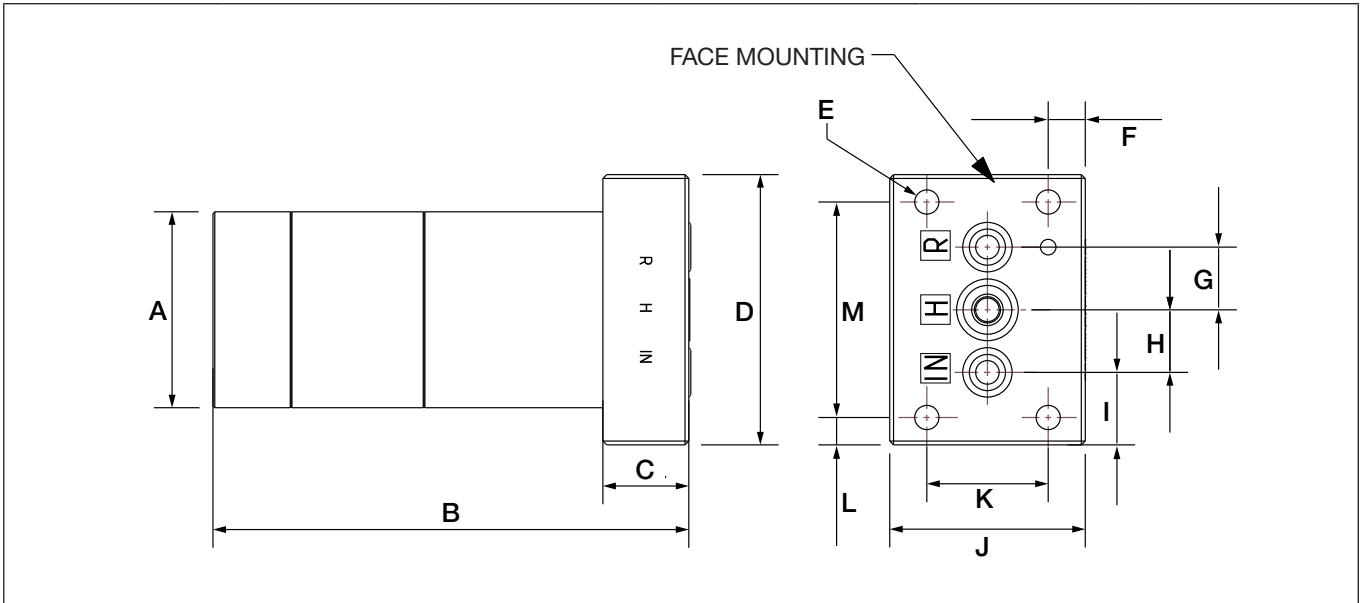


D03/CETOP 3 VALVE MOUNTING



Item	Dimension		Item	Dimension	
	inch	mm		inch	mm
A	ø 2.76	ø 70.0	E	2.83	72.0
B	8.53	216.7	F	0.74	18.8
C	3.15	80.0	G	0.41	10.5
D	2.76	70.0	Ports: A (advance), B (retract), P (pump) and T (reservoir)		

2.7 External Dimensions & Port Locations - PIDMxxx Models



Item	Dimension		Item	Dimension	
	inch	mm		inch	mm
A	ø 1.97	ø 50.0	I	0.73	18.5
B	4.79	121.7	J	1.97	50.0
C	0.87	22.0	K	1.22	31.0
D	2.72	69.0	L	0.28	7.0
E	ø 0.24	ø 6.2	M	2.17	55.0
F	0.37	9.5	Outlet Port [H]	Maximum ø 0.236	Maximum ø 6
G	0.63	16.0	Inlet Port [IN]	Maximum ø 0.236	Maximum ø 6
H	0.63	16.0	Return Port [R]	Maximum ø 0.236	Maximum ø 6

3.0 DESCRIPTION

The Enerpac PID Series oil-to-oil intensifier increases hydraulic system output pressure as needed, allowing the system to power a cylinder or other device which requires a higher inlet pressure.

The self-contained device boosts inlet pressure by up to a 6.6:1 ratio (depending on model selected) without the use of external power. The intensifier also maintains high pressure and automatically compensates for the consumption of hydraulic oil on the high pressure side.

Key features and benefits include:

- Compact and self-contained design allows for ease of installation.
- Internal bypass valving helps ensure high output flow rates.
- Available in a wide range of intensification ratios to suit various operating pressure requirements.
- Integral dump valve eliminates the need for an external pilot check valve.
- Internal filter screens located in the ports protect the intensifier from debris. An internal flow metering orifice prevents damage from excessive flow.
- Precision fit of all internal components helps provide long operating life.

4.0 PRINCIPLES OF OPERATION

When hydraulic pressure from an existing power source is limited, the intensifier increases the output pressure to satisfy the required application.

- When oil is supplied to the inlet port, it flows freely past the check valves and the dump valve, advancing the cylinder.
- As the inlet pressure increases, the intensifier's built-in oscillating pump automatically increases the outlet pressure by a specific intensification ratio. This ratio will vary depending on intensifier model number.
- The intensifier's oscillating pump will make a soft "ticking" sound as it oscillates, indicating that pressure is building.
- When the maximum pressure is reached, the oscillation frequency lowers and balances at the maximum pressure. At this point, the intensifier's oscillating pump stops oscillating or oscillates very slowly.
- Free flow from the cylinder back to the tank occurs when the directional control valve is shifted to supply flow to the return port.

Refer to Section 6.0 for additional model-specific intensifier operation information.

5.0 INSTALLATION AND SETUP

5.1 Receiving Instructions

Visually inspect all components for shipping damage. Shipping damage is not covered by warranty. If shipping damage is found, notify carrier at once. The carrier is responsible for all repair and replacement costs resulting from damage in shipment.

5.2 Description of Models & Porting

PIDxxxA and PIDHxxx models are inline mounted units designed to be installed in a hydraulic circuit using threaded SAE or BSPP fittings and either tubing or hoses. PIDxxxA models have a mounting nut at the outlet port which can be used to secure the intensifier to a bracket.

PIDVxxxA and PIDHVxxx models are designed to mount on a D03 (CETOP3) valve manifold, and require a directional control valve to control the oil flow through the Intensifier.

PIDMxxx models are designed to face mount on a custom manifold block, allowing the intensifier to be integrated into a circuit.

5.3 Installation

- Refer to hydraulic pressure specifications in Section 2.0. Do not exceed the maximum pressure limits for your intensifier model. Also refer to additional information in Section 5.5.
- In order to prevent damage to the intensifier, the inlet oil flow must not exceed the maximum allowable flow rate for your intensifier model. Refer to maximum flow specifications in Section 2.0.
- Do not place the intensifier into operation unless you are certain the machine or system into which it is installed complies with all applicable regulations and directives required by local and regional authorities.
- For PIDxxxA and PIDHxxx models, refer to the tables in Section 2.0 for SAE and BSPP port sizes.

5.4 System Design

- All current production PID Series intensifier models include a built-in filter screen at each port to block large particles such as metal chips. In addition, a flow control orifice located in the inlet port limits the flow rate into the intensifier. Separate external filters and flow control valves are not required.
- During installation, make sure that there are no restrictions downstream of the return port, which could create back pressure in the return line. The outlet pressure from the intensifier is based on the differential between the Inlet and return port pressure. Any backpressure on the return port will proportionally reduce the outlet pressure.

- The intensifier is designed to automatically compensate for downstream pressure losses. However, a sufficient inlet flow rate of approximately 79 in³/min [1.3 lpm] is required to maintain this capability.

5.5 Hydraulic Pressure

CAUTION Failure to observe maximum pressure ratings could result in personal injury, improper operation, equipment failure and/or property damage.

- Refer to the tables in Section 2.0 for intensifier maximum pressure ratings.
- All models **except** PID322A, PID402A, PID502A and PID663A: The maximum hydraulic pressure at the intensifier outlet ports “A”, “B” or “H” (as applicable for your intensifier model) must not exceed 5000 psi [350 bar].
- Models PID402A, PID502A and PID663A: The maximum hydraulic pressure at the intensifier outlet port “H” must not exceed 11,600 psi [800 bar].
- Model PID322A: The maximum hydraulic pressure at the intensifier outlet port “H” must not exceed 9,600 psi [662 bar].

NOTICE Special high pressure fittings must be used in systems with pressures exceeding 5000 psi [350 bar]. Contact Enerpac for additional information.

- Minimum hydraulic pressure at the inlet port for all models is approximately 290 psi [20 bar]. Intensifier may not function if flow rate is too low.

5.6 Torque Specifications

- Observe proper torque values when installing hydraulic fittings in the ports of PIDxxxA and PIDHxxx Series hydraulic intensifiers. These units use threaded SAE or BSPP ports.
- Mounting hardware is supplied with PIDMxxx models only. Refer to Figure 3 for mounting bolt torque specifications.
- Mounting bolts and other hardware (as needed) is to be supplied by the user for other intensifier models.

Ports	Hydraulic Connection Size and Type	Maximum Tightening Torque	
		lb-ft	Nm
Inlet (IN)	G-1/4" Threaded with steel washer	29.5	40
Return (R)	G-1/4" Threaded with aluminium washer	22.0	30
Outlet (H)	G-1/4" Threaded with cutting edge	29.5	40

Figure 1: Torque Specifications, PIDxxxA Models

Ports	Hydraulic Connection Size and Type	Maximum Tightening Torque	
		lb-ft	Nm
Inlet (IN)	G-3/8" Threaded with steel washer	44.3	50
	G-3/8" Threaded with aluminium washer	29.5	40
	G-3/8" Threaded with cutting edge	44.3	60
Outlet (H)	G-1/2" Threaded with steel washer	95.9	130
	G-1/2" Threaded with cutting edge	95.9	130

Figure 2: Torque Specifications, PIDHxxx Models

Mounting Bolt Size	Maximum Tightening Torque	
	lb-ft	Nm
M6 x 25 12.9 - DIN 912	2.8	18
Note: PIDMxxx models are supplied with four mounting bolts and four 6.4 mm washers. Place washers under the bolt heads prior to tightening.		

Figure 3: Torque Specifications, PIDMxxx Models

5.7 Directional Control Valve Recommendations

- To prevent hydraulic oil leakage from occurring, it is strongly recommended that an **open center** control valve be used with the intensifier. See Figure 4, upper view.
- Use of a **closed center** control valve is not recommended. See Figure 4, lower view.

NOTICE If a closed center control valve is used, contaminated hydraulic oil can cause the internal check valves of the intensifier to leak high-pressure oil back to the inlet (IN) and return (R) connection. In addition, on PIDVxxxA, PIDVHxxx and PIDMxxx models, if high pressure (> 3,000 psi [> 207 bar]) becomes trapped between the intensifier and the directional control valve, the connecting bolts can be stretched, resulting in possible external oil leakage.

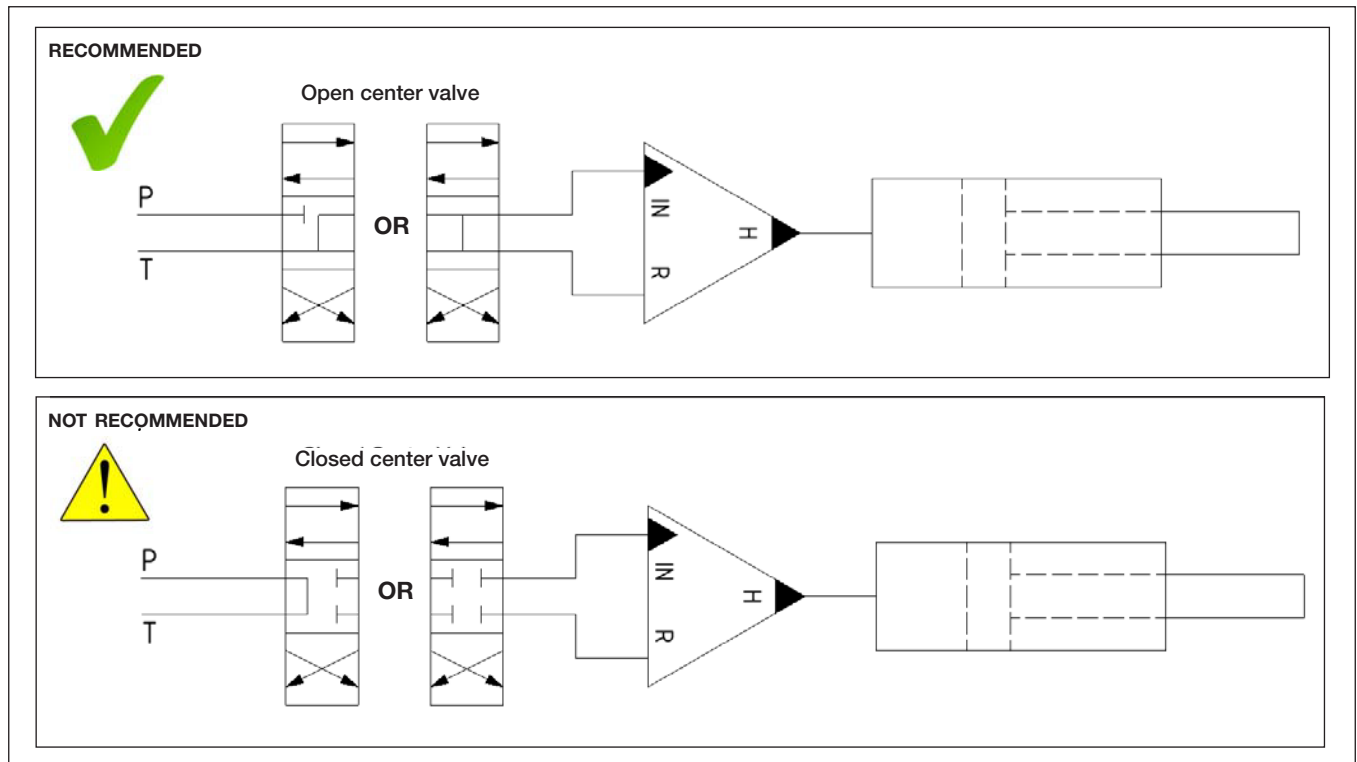


Figure 4: Open Center Control Valve Recommended

5.8 Oil Filtration Requirements

Oil filtration must be in accordance with the ISO 44306 standard or the equivalent standard applicable in your region or country.

Ensure that the hydraulic oil is clean. Filtration must meet the ISO target levels and micron ratings shown in the table in Figure 5.

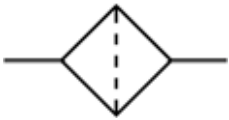
		0 to 2,000 psi [0 to 140 bar]		2,000 to 3,000 psi [141 to 207 bar]	
		ISO Target Levels	Micron Ratings	ISO Target Levels	Micron Ratings
Media					
Oil	> 5 cSt	19/17/14	10	20-109	15
Water/Water Glycol	< 5 cSt	18/16/13	5	20-87	14

Figure 5: Oil Filtration Requirements

6.0 OPERATION

6.1 PIDxxxA and PIDHxxx Models

When hydraulic oil enters the inlet (IN) port, it freely flows through the check valves (KV1, KV2) to the cylinder. The cylinder then advances.

When cylinder pressure reaches the supply pressure, the intensifier oscillating pump (OP) automatically starts oscillating and begins to increase the pressure in the cylinder by the designated intensification factor (varies by intensifier model).

Once the desired pressure is reached, the oscillation frequency drops to a level that provides only enough flow to maintain maximum pressure in the cylinder. If no additional flow is required, pump oscillation stops.

Adjusting the inlet pressure also adjusts the outlet pressure. The outlet pressure is directly proportional to the inlet pressure. For example, in a model PID321 intensifier, with a 3.2:1 ratio, 100 psi [6.9 bar] of supply pressure adjustment raises or lowers the outlet pressure by 321 psi [22.1 bar].

To allow cylinder retraction, dump valve (DV) is pilot operated to open when the control valve (CV) is shifted to the retract position. This allows the oil from the advance side of the cylinder to flow back through the inlet (IN) port to the valve and back to the pump reservoir.

Note that if a double-acting cylinder is used, a secondary circuit from the cylinder retract port must be connected to allow retraction of the cylinder.

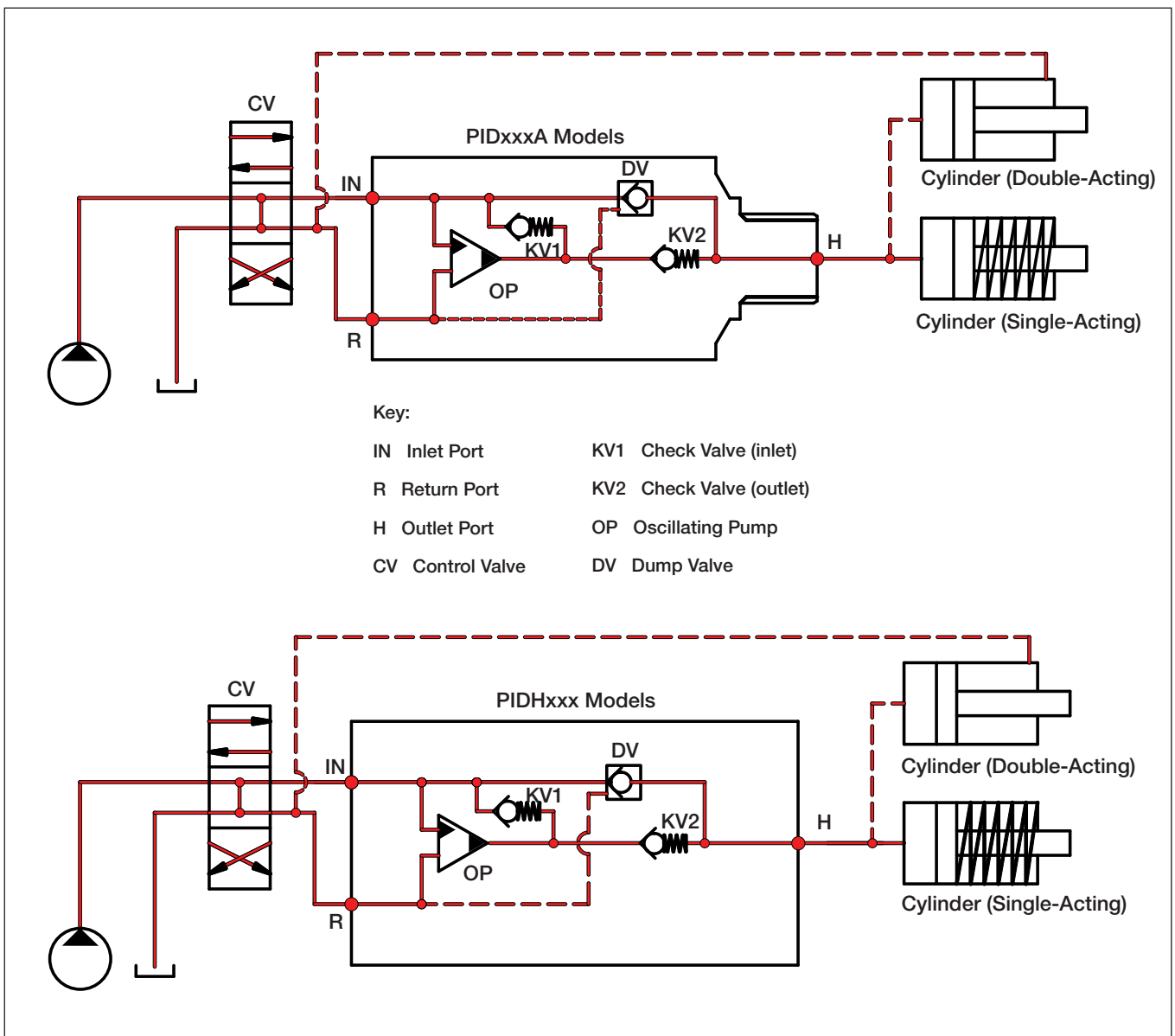


Figure 6: Hydraulic Schematic, PIDxxxA and PIDHxxx Models

6.2 PIDVxxxA and PIDVHxxx Models

The PIDVxxxA and PIDVHxxx models function in the same manner as the PIDxxxA models (refer to Section 6.1). However, for the PIDVxxxA, the intensifier is integrated into a D03 (CETOP 3) ported manifold block. A control valve is required and must be mounted above the intensifier in a valve stack on a D03 (CETOP 3) valve manifold.

The high pressure advance flow is directed to port A on the valve manifold and retract flow is directed to port B. This allows the cylinder to be plumbed from the valve manifold in a typical circuit.

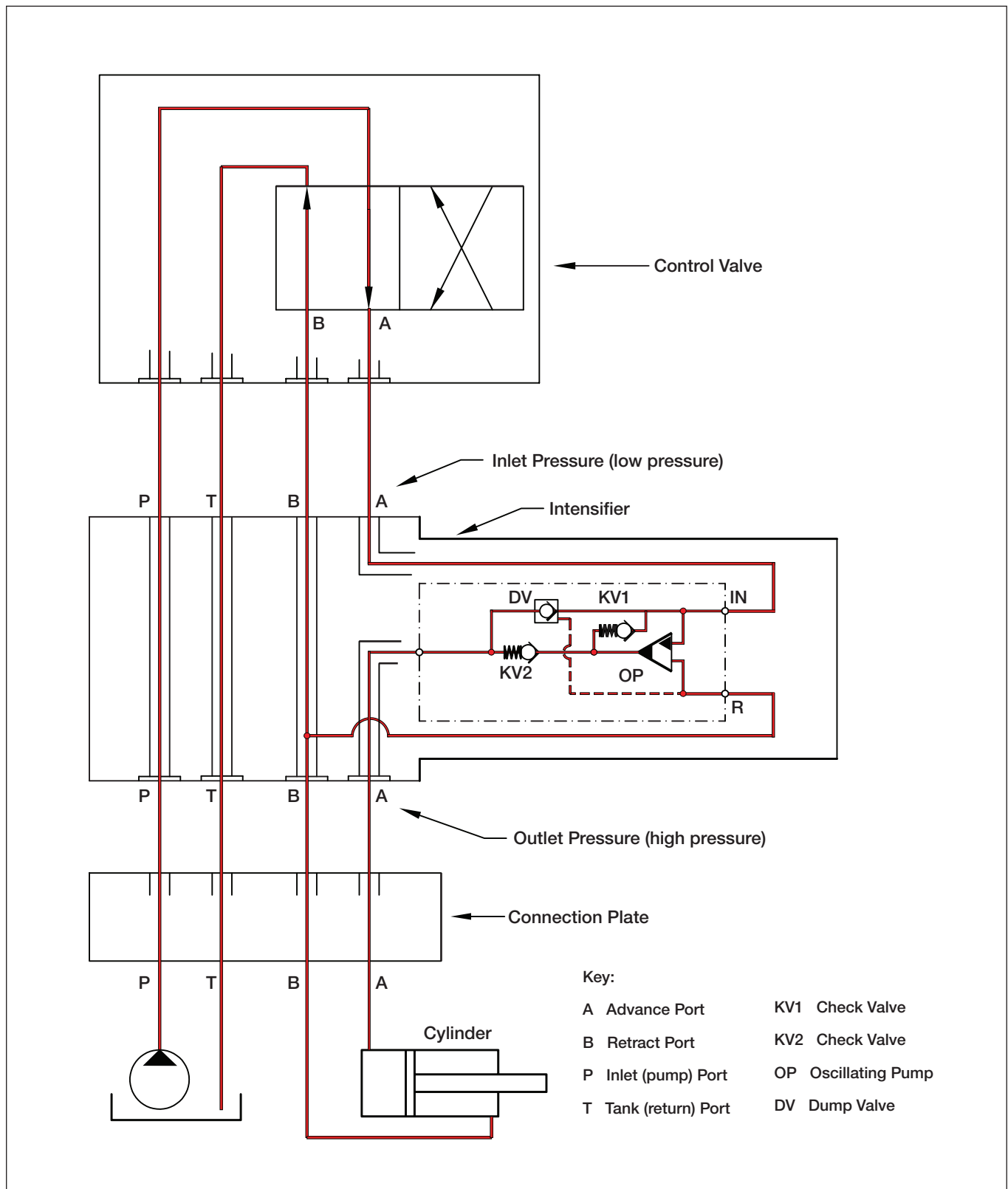


Figure 7: Hydraulic Schematic, PIDVxxxA and PIDVHxxx Models

6.3 PIDMxxx Models

The PIDMxxx models function in the same manner as the PIDxxxA models (refer to Section 6.1). However for the PIDMxxx, the intensifier is integrated into a flange mount manifold block that is designed to face-mount to a custom manifold block. This allows the user to integrate the intensifier into a block with other components, such as a pressure gauge, cartridge directional valve, pressure reducing valve or pressure switch/transducer.

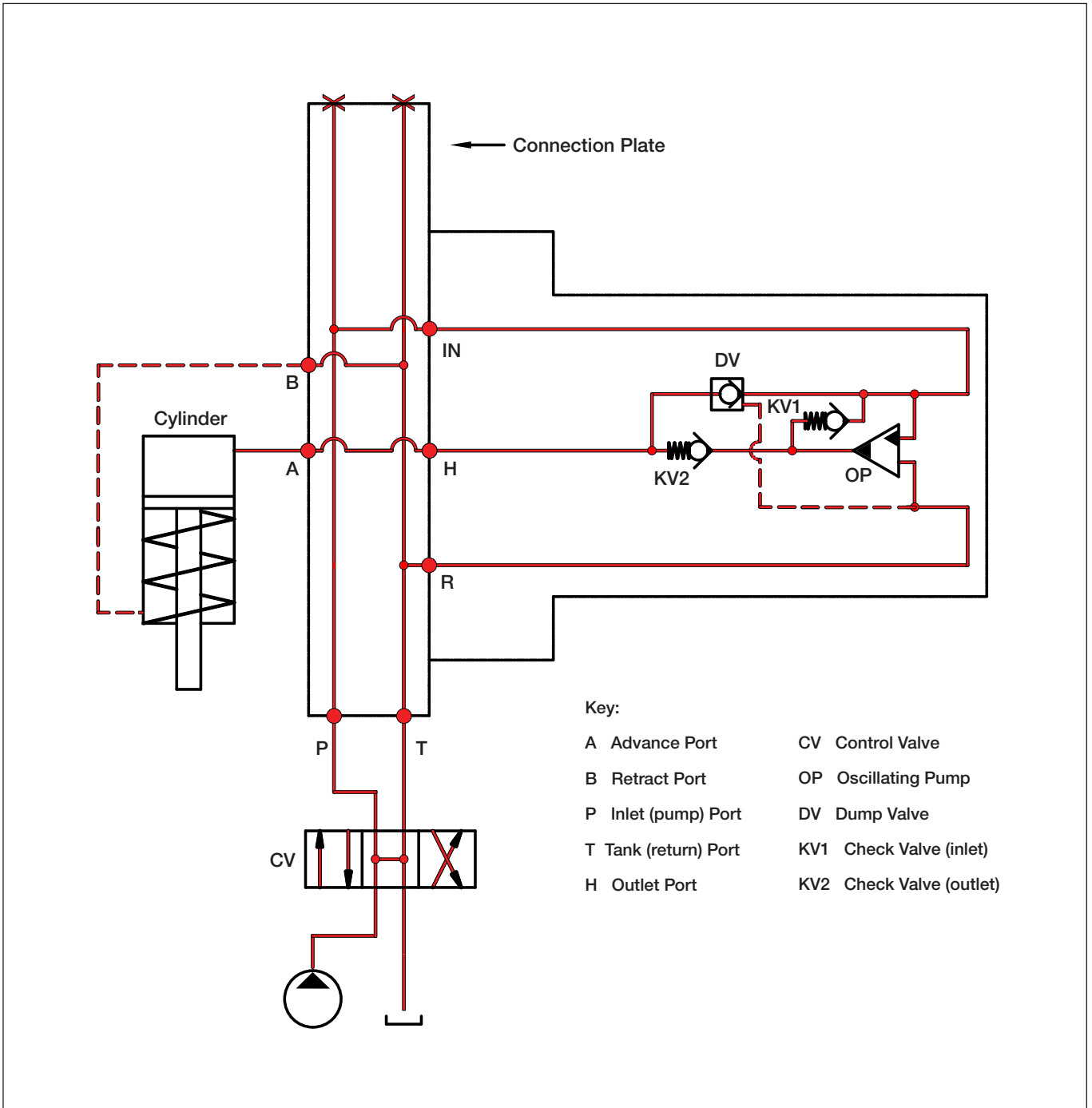


Figure 8: Hydraulic Schematic, PIDMxxx Models

7.0 SERVICE

Except for a few maintenance oriented items, the PID Series intensifiers contain no user-replaceable parts.

Maintaining the proper filtration and flow rate of the inlet oil will help provide trouble-free operation. Service kits containing replacement filters, O-rings and orifices are available from your Enerpac distributor or authorized service center. Refer to the parts lists and diagram for your intensifier model in Section 9.0.

If an internal malfunction is suspected, have the intensifier inspected by an Enerpac authorized service center.

⚠ WARNING Shut down hydraulic power source before performing any service or maintenance activities. Be sure that hydraulic pressure is completely relieved before loosening intensifier fittings or mounting hardware. Failure to observe this precaution could result in the release of pressurized hydraulic oil and possible skin penetration. Serious personal injury could result.

8.0 TROUBLESHOOTING

Only qualified hydraulic technicians should troubleshoot the intensifier and related system components.

Refer to the schematic diagrams in figures 6, 7 and 8 for descriptions of intensifier components referenced in the troubleshooting guide.

A system failure may or may not be the result of an intensifier malfunction. To determine the cause of the problem, the complete system must be included in any diagnostic procedure.

The following troubleshooting guide is intended to be used only as an aid in determining if a problem exists. For repair service, contact an Enerpac authorized service center.

Troubleshooting Guide		
Problem	Possible Cause	Corrective Action
1. Intensifier does not oscillate and pressure does not increase.	a. inlet pressure too low.	Increase pressure. Refer to the tables in Section 2.0 for the minimum pressure for your intensifier model.
	b. Dirt or metal chips in KV1 valve or DV valve. Oil contamination.	Clean or replace intensifier filter screens and orifice as required. Refer to Section 9.0 for parts information. Change oil in hydraulic system.
2. Intensifier does not reach maximum intensified pressure.	Dirt or metal chips in KV1 valve. Oil contamination.	Clean or replace intensifier filter screens and orifice as required. Refer to Section 9.0 for parts information. Change oil in hydraulic system.
3. Intensifier operates continuously (does not stop oscillating).	Dirt or metal chips in KV1 valve or DV valve. Oil contamination.	Clean or replace intensifier filter screens and orifice as required. Refer to Section 9.0 for parts information. Change oil in hydraulic system.
4. Intensifier loses pressure when hydraulic oil is hot.	Damaged high pressure piston due to oil contamination.	See authorized service center. Change oil in hydraulic system.
NOTICE If corrective actions fail to restore proper operation, take the intensifier to an Enerpac authorized service center for diagnosis. Intensifier is not user-repairable.		

(continued on next page)

Troubleshooting Guide (continued)		
Problem	Possible Cause	Corrective Action
5. Oil leakage between top and middle portions of intensifier. Stretched bolts.	a. Inlet pressure too high.	Reduce inlet pressure. Refer to the tables in Section 2.0 for the maximum allowable inlet pressure for your intensifier model.
	b. Inlet flow rate too high.	Reduce inlet flow rate. Refer to the tables in Section 2.0 for the maximum allowable inlet flow rate for your intensifier model.
	c. Closed center control valve being used.	Replace closed center control valve with open center control valve. Refer to Section 5.7 for additional information.
6. Intensifier will not sustain high pressure.	Dirt or metal chips in KV2 valve or DV valve. Oil contamination.	Clean or replace intensifier filter screens and orifice as required. Refer to Section 9.0 for parts information. Change oil in hydraulic system.
7. Intensifier dump (DV) valve will not relieve pressure.	Inlet pressure too low.	Raise inlet pressure.
8. Outlet port pressure fluctuates.	Pressure peaks at the inlet port.	Check hydraulic system for pressure fluctuations.
NOTICE If corrective actions fail to restore proper operation, take the intensifier to an Enerpac authorized service center for diagnosis. Intensifier is not user-repairable.		

9.0 REPLACEMENT PARTS

Replacement parts are shown in the following parts lists (sections 9.1 through 9.5). Refer to the parts list for your intensifier model.

9.1 Parts List for PIDxxxA Models

Item 2: Apply anti-seize compound to threads. Torque to 3.7 lb-ft [5 Nm]. Use 2.5 mm hex wrench.

Item	Description		Qty
1	*	Filter Screen, Outlet (H) Port	1
2	*	Filter Screen, Inlet (IN) and Return (R) Ports	2
3	*	Orifice, 1.6 mm, Inlet (IN) Port	1

* Items included in Parts Kit, PIDK1.

9.2 Parts List for PIDHxxx Models

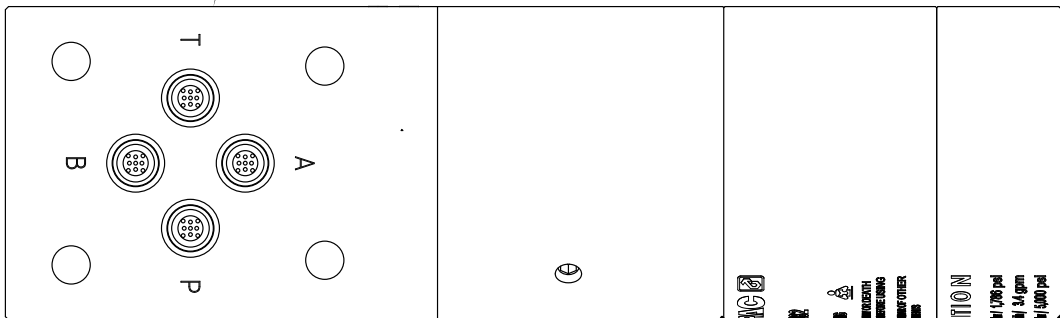
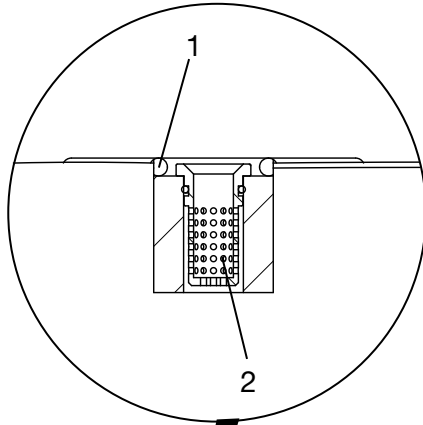
Item 3: Apply anti-seize compound to threads. Torque to 7.4 lb-ft [10 Nm]. Use 4 mm hex wrench.

Item	Description		Qty
1	+	Filter Screen, Outlet (H) Port	1
2	+	Filter Screen, Inlet (IN) and Return (R) Ports	2
3	+	Orifice, 2.5 mm, Inlet (IN) Port	1

+ Items included in Parts Kit, PIDHK1.

9.3 Parts List for PIDVxxxA Models

(Sectional View)



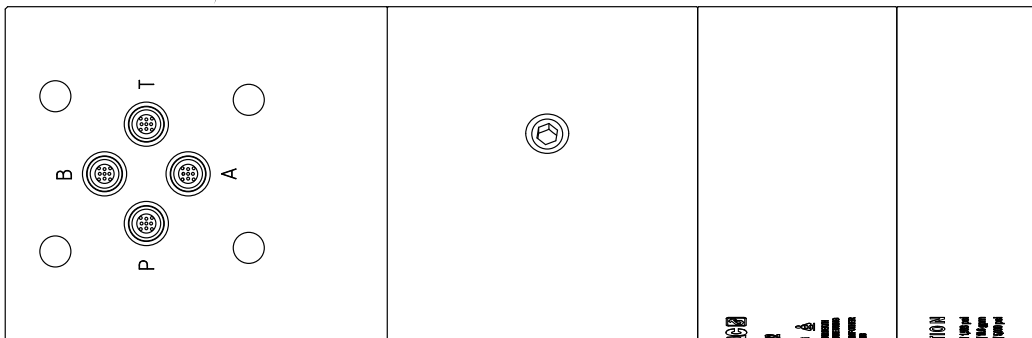
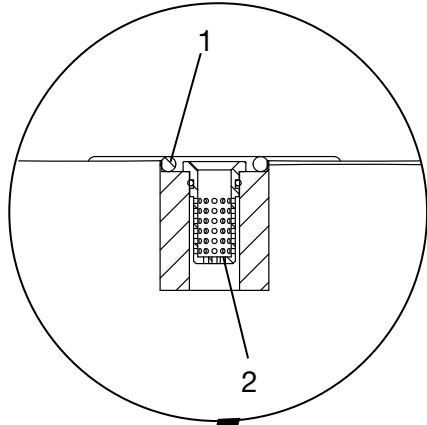
Item	Description		Qty
1	■	O-Ring	4
2	■	Filter Screen (all ports)	4

■ Items included in Parts Kit, PIDVK1.

Note: Replacement inlet orifice is not available for PIDVxxxA intensifier models.

9.4 Parts List for PIDVHxxx Models

(Sectional View)

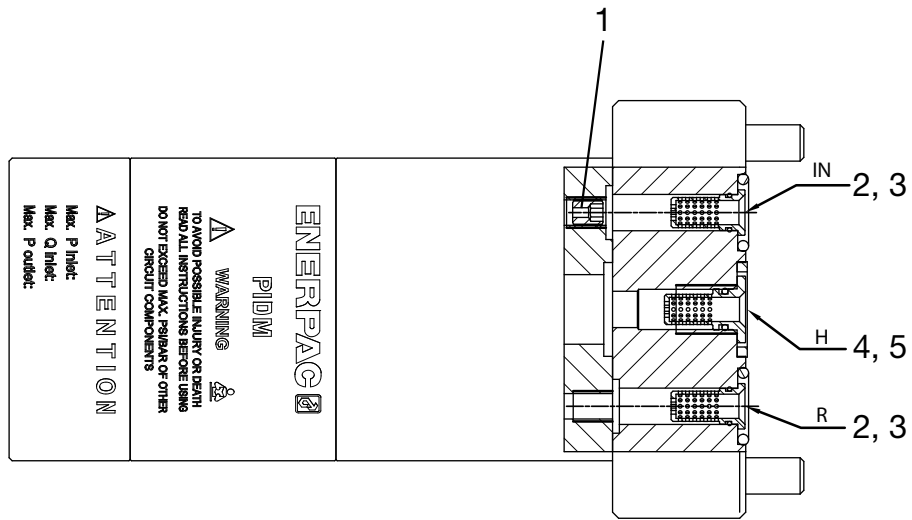


Item	Description	Qty
2 ▲	O-Ring	4
1 ▲	Filter Screen (all ports)	4

▲ Items included in Parts Kit, PIDVHK1.

Note: Replacement inlet orifice is not available for PIDVHxxx intensifier models.

9.5 Parts List for PIDMxxx Models



Item	Description		Qty
1	●	Orifice, 1.6 mm, Inlet (IN) Port	1
2	●	Filter Screen, Inlet (IN) and Return (R) Ports	2
3	●	O-Ring, Inlet (IN) and Return (R) Ports	2
4	●	Filter Screen, Outlet (H) Port	1
5	●	O-Ring, Outlet (H) Port	1

● Items included in Repair Parts Kit, PIDMK1.



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