Phasing Cylinder Stroke Gain or Loss from Larger to Smaller Bore Size

BORE IN INCHES	BORE IN mm	SHAFT IN INCHES	SHAFT IN mm	AREA PISTON SIDE	AREA ROD SIDE	STROKE GAIN OR LOSS	BORE IN INCHES
5	127.00	1.5	38.10	126.685	115.283		5
					0.82%	GAIN	
4.75	120.65	1.5	38.10	114.333	102.932		4.75
					0.31%	GAIN	
4.5	114.30	1.5	38.10	102.615	91.213		4.5
					0.35%	LOSS	
4.25	107.95	1.375	34.93	91.53	81.949		4.25
					1.06%	GAIN	
4	101.60	1.375	34.93	81.078	71.498		4
					0.33%	GAIN	
3.75	95.25	1.375	34.93	71.26	61.68		3.75
					-0.64%	GAIN	
3.5	88.90	1.25	31.75	62.075	54.158		3.5
					-1.17%	LOSS	
3.25	82.55	1.25	31.75	53.524	45.606		3.25
						SAME	
3	76.20	1.25	31.75	45.606	37.688		3
					-1.68%	GAIN	
2.75	69.85	1.125	28.58	38.322	31.909		2.75
					0.75%	GAIN	
2.5	63.50	1.067	27.10	31.671	25.95		2.5
					1.14%	GAIN	
2.25	57.15	1.067	27.10	25.654	20.586		2.25
					1.54%	GAIN	
2	50.80	1	25.40	20.269			2

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PHASING CYLINDER INSTALLATION PROCEDURE

1. **FILL ROD END OF CYLINDERS WITH OIL** (MANUALLY WITH CONTAINER & FUNNEL) Preferably this is done in the horizontal position off the machine, but can be done on the machine if rod port is in uppermost position.
2. **INSTALL CYLINDERS**
3. **CONNECT HOSES**
4. **BACK BLEED THE SYSTEM** (This is done by bleeding the air out of the hoses working on the retract side) Crack the hose connection at the rod end od the second smallest cylinder.
5. **OPERATE CONTROL VALVE IN THE CYLINDER RETRACT POSITION UNTIL ALL THE AIR IS DISPELLED FROM CONNECTING HOSE, THEN TIGHTEN FITTING** (This oil bleeding is fairly slow as the oil has to go through the phasing hole which is usually 3mm Dia allowing about 10 Litres per minute through, so allow enough time to displace the air out of the hose. This is why it is important to fill the cylinders with oil prior to bleeding
6. **REPEAT THIS STEP** If more than two cylinders are in the one phasing system working on the third smallest cylinder rod end to bleed from.
7. **EXTEND BLEEDING.** (Crack the base port of the largest cylinder operate the extend control valve carefully to bleed the air from the supply hose) This hose will bleed a lot faster than on the rod side as you have no restriction as the oil coming direct from the tractor or oil surface

This has the system bleed free of air. The cylinders can now be extended with care. There may be a small amount of air in the system; this can be dispelled by holding the control valve open at end of stroke to further bleed any remaining oil through the system via the phasing system in the cylinders.

***** REMEMBER ALL PHASING SYSTEMS HAVE SOME INACCURACY MOST COME LESS THAN 1.8% OF STROKE***

There are 4 areas to take into consideration when using Phasing Cylinders

1. Mount Ports uppermost so no air is trapped in the cylinder (particularly when mounting horizontally do not use side ports)
2. Bypass oil: make sure that there is enough oil supply to bypass and extra to do the pushing: Nordon Cylinders have different bypass amounts for each bore size. Usual bypass from 6 to 20 litres per min so either specify bypass flow or ensure there is enough oil available
3. Phasing Cylinders can be found to have up to 6mm end float at each end so allow for this in the mounting design
4. Nordon Cylinders Standard Phasing piston seal is a Wynns CC seal which has a high mechanical load which may have a sticking or jerky operation at low pressures. If the load is working at a low working pressure please specify a Hallite 755 Seal

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