

Piping chart									
Schematic	Hydraulic Line	Material	Size		Inside Dia.	Outside Dia.	Tube Wall	Tube Pressure Rating	Max pressure
Label					mm	in	mm	in	mm
A	Pump Suction	Pipe, A106 GR B	2-1/2" SCH 40		62.74	2.470	73.03	2.875	5.16
B	Pump To HPU - Pressure	Tube, Steel, DN32	38mm x 4mm WT DIN2391 ST 35 BK		30.00	1.181	38.00	1.496	4.00
C	Pump To HPU - Drain	Tube, Steel, DN20	22mm x 2mm WT DIN2391 ST 35 BK		18.00	0.709	22.00	0.866	2.00
D	Pump To HPU - Load Sense	Tube, SS	3/8" x .035" WT		7.75	0.305	9.53	0.375	0.89
E	HPU To Crane - Pressure	Tube, Steel, DN32	38mm x 3mm WT DIN2391, ST 35 BK		32.00	1.260	38.00	1.496	3.00
F	Crane to HPU - Return	Pipe, A106 GR B	1-1/2" SCH 40		40.89	1.610	48.26	1.900	3.68
G	Crane to HPU - CT Return	Tube, Steel, DN25	28mm x 2 mm WT DIN2391 ST 35 BK		24.00	0.945	28.00	1.102	2.00
H	Crane to HPU - Drain	Tube, Steel, DN20	22mm x 2mm WT DIN2391 ST 35 BK		18.00	0.709	22.00	0.866	2.00
I	Crane To Crab pot Hauler	SS Tube, DN 20	25mm x 2.5mm WT DIN2462 316L SS		20.00	0.787	25.00	0.984	2.50
J	Crane To Net Lifter	SS Tube, DN 20	25mm x 2.5mm WT DIN2462 316L SS		20.00	0.787	25.00	0.984	2.50
K	HPU to Capstan	Tube, Steel, DN15	18mm x 2mm WT DIN 2391 ST 35 BK		14.00	0.551	18.00	0.709	2.00
L	HPU To Towline Reel	Tube, Steel, DN15	18mm x 2mm WT DIN 2391 ST 35 BK		14.00	0.551	18.00	0.709	2.00
M	HPU to Anchor Windlass Control Valve - Pressure	Tube, Steel, DN20	22mm x 2mm WT DIN2391 ST 35 BK		18.00	0.709	22.00	0.866	2.00
N	HPU to Anchor Windlass Control Valve - Return	Tube, Steel, DN20	22mm x 2mm WT DIN2391 ST 35 BK		18.00	0.709	22.00	0.866	2.00
O	Anchor Windlass Control Valve to Windlass	Tube, Steel, DN15	18mm x 2mm WT DIN 2391 ST 35 BK		14.00	0.551	18.00	0.709	2.00
P	HPU To Bow Thruster Control Valve - Pressure	Tube, Steel, DN32	38mm x 4mm WT DIN2391 ST 35 BK		30.00	1.181	38.00	1.496	4.00
Q	HPU To Bow Thruster Control Valve - Return	Pipe, A106 GR B	1-1/2" SCH 40		40.89	1.610	48.26	1.900	3.68
R	HPU To Bow Thruster Control Valve - Drain	Tube, Steel, DN20	22mm x 2mm WT DIN2391 ST 35 BK		18.00	0.709	22.00	0.866	2.00
S	Drain to HPU - After Tee	Tube, Steel, DN32	35mm x 2mm WT DIN 2391 ST 35 BK		31.00	1.220	35.00	1.378	2.00
T	Return to HPU - After Tee	Pipe, A106 GR B	2" SCH 80		49.25	1.939	60.33	2.375	5.54

Notes:		
1) Allowable working pressures are based on equations from DIN 2413 part III for dynamic stress using a material characteristic value (K) of 226 Mpa (32,780 psi)		
Yield strength = 235 Mpa (34,000 psi)		
Tensile strength = 340 Mpa (49,000 psi)		
Carbon Steel St. 37.4 tubing material per DIN 1630		
Seamless, cold drawn under inert gas, normal annealed per DIN 2391C, Part 2		
Ref Parker "Table R3 - Seamless EO Steel tubes"		
2) Allowable working pressures for pipe (Bow Thruster P & T) is based on equations from ANSI B31.1 for ASTM A53 Grade B or ASTM A106 Grade B seamless pipe		
3) Piping above deck is to be stainless steel; Material-No.: 1.4571		
4) * Indicates a 3:1 Safety Factor (min)		

MODE	ENABLED FUNCTIONS	FLOW (GPM)
BOAT HANDLING	CRANE (DAVT) AND THRUSTER	74 GPM
MOORING/ANCHOR/TOWING	CAPSTAN, WINDLASS, TOWLINE REEL & THRUSTER	68 GPM
FISHING	NET/CRAB POT HAULER, CRANE AND THRUSTER	73 GPM
THRUSTER	THRUSTER	49 GPM
ALIGN/SLIDE	CAPSTAN, WINDLASS AND CRANE	32 GPM

SOLENOID CHART			
SOL. TAG	FUNCTION	POWER	VOLTAGE
DV1	FLOW SETTING FOR CRANE/FISHING EQUIP	8W	24VDC SUPPLY + SIG
DV2	FLOW SETTING FOR ANCHOR WINDLASS/CAPSTAN	8W	24VDC (DN/DFT)
DV3	CAPSTAN SPEED/DIRECTION CONTROL	7W	24VDC SUPPLY + SIG
DV4	TOWLINE REEL SPEED/DIRECTION CONTROL	7W	24VDC SUPPLY + SIG
DV5	THRUSTER FLOW (HIGH/LOW)	8W	24VDC SUPPLY + SIG
T1	THRUSTER SPEED/PRESSURE CONTROL		
A1	THRUSTER DIRECTION CONTROL (PORT)	23W	24VDC (DN/DFT)
B1	THRUSTER DIRECTION CONTROL (STBD)	23W	24VDC (DN/DFT)
SV1	PUMP ENABLE (PORT)	22W	24VDC (DN/DFT)
SV2	PUMP ENABLE (STBD)	22W	24VDC (DN/DFT)

REV	DATE	REVISION NUMBER	REVISIONS	BY	APP'D
A	17SEP10	-	CONSOLIDATED DCV'S, ADDED DRAIN LINE, ADDED PIPE SIZE CHART	SMW JBH	
B	18OCT10	-	ADDED FLEXIBLE CONNECTIONS TO CRANE, UPDATED PIPE SIZE CHART	MAJC SMW	
C	07JAN11		UPDATED BOW	MAJC SMW	
D	06MAR11	1188	UPDATED LINE SIZES AND TABLE ON SHEET 2	MAJC SMW	
AF	29/04/12	--	AS TITLED	TK	FP

TITLE	DRAW NUMBER	ISSUE	DESCRIPTION	MATERIAL	UNIT
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