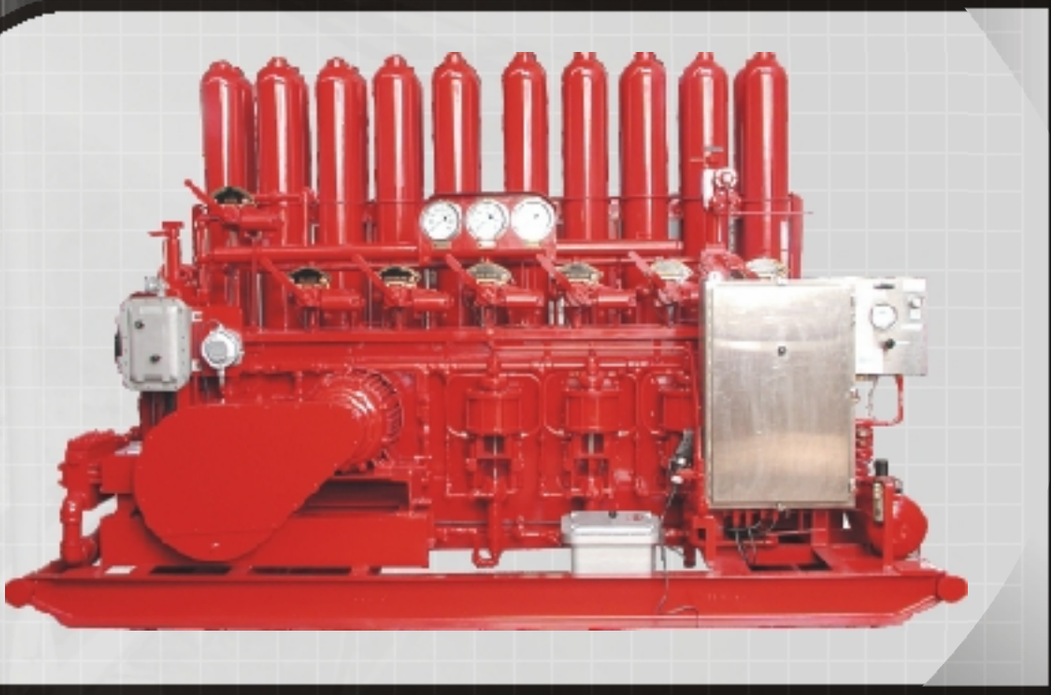
BOP Accumulator Units



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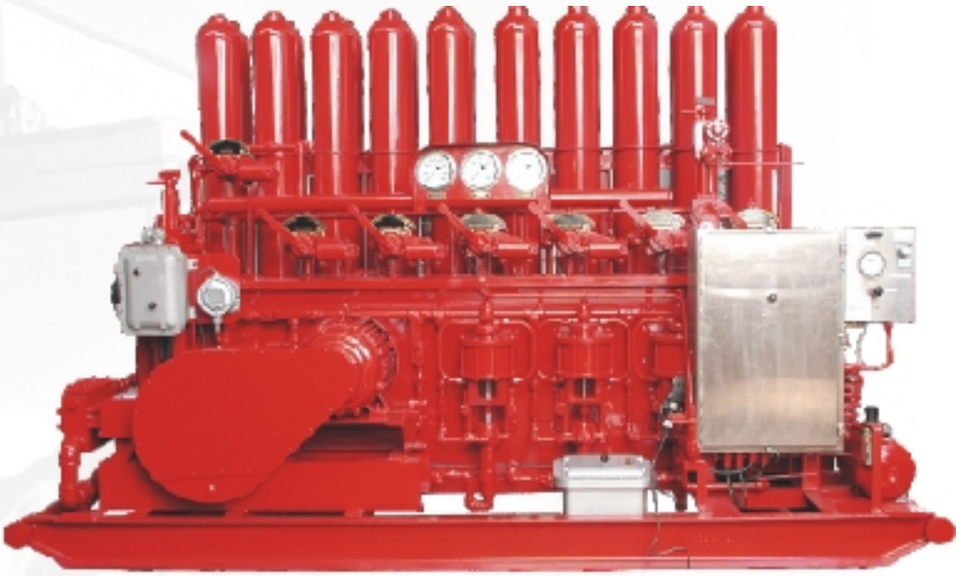
BOP Accumulator Unit

BOP Accumulator Unit



Model Number Identification System

L	200	M	6	EA	25	S	A	2

Service Location
- L - land
- O - offshore

Accumulator Capacity
After deducting one gallon per accumulator for bladder/float

Temperature Rating
- T - Tropical
- M - Mild
- C - Cold
- EC - Extreme Cold
- P - Polar

Stations
Total Manifold and Annular Functions

Pumps
- EA - Electric and Air
- EE - Both Electric

Motor HP
- 10
- 15
- 20
- 25
- 30
- 40
- 50
- 60
- 100

Voltage
- A - 230
- B - 380
- C - 460
- S - Special

Panel Type
- A - Air
- E - Electrical

Number of Remote Panels
- 1
- 2

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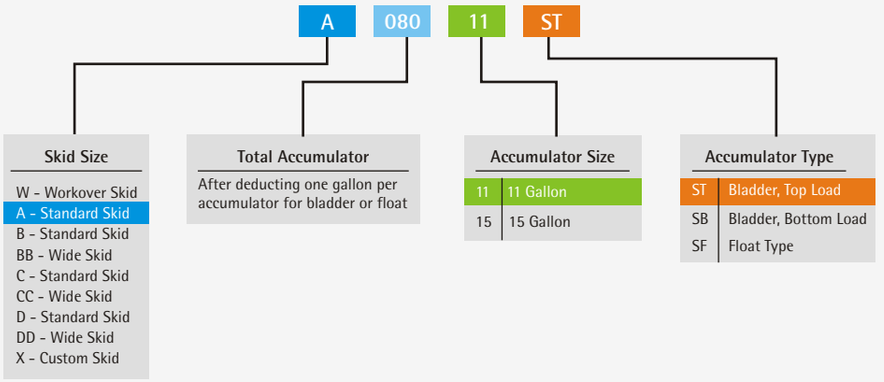
Accumulator Module

Model Number Identification System



Model Number	Accumulator Bottles		Max No. Valves	Reservoir Nom. Capacity		Approximate Dimensions						Approximate Dry Weight	
						Length		Width		Height			
	Installed	Maximum		Gal.	Liters	Inches	cm	Inches	cm	Inches	cm	lbs.	Kg.
W040 - 11ST	4	4	5	125	473	99	251	60	152	78	198	2340	1062
A080 - 11ST	8	8	5	210	795	116	295	72	183	78	198	4870	2210
B120 - 11ST	12	16	5	280	1060	150	381	72	183	78	198	6850	3107
BB120 - 11ST	12	16	5	280	1060	150	381	80	203	78	198	7846	3559
B160 - 11ST	16	16	5	280	1060	150	381	72	183	78	198	8130	3688
BB160 - 11ST	16	16	5	280	1060	150	381	80	203	78	198	9127	4140
C200 - 11ST	20	24	7	350	1325	186	473	72	183	78	198	10010	4541
CC200 - 11ST	20	24	7	350	1325	186	473	80	203	78	198	11008	4993
C240 - 11ST	24	24	7	350	1325	186	473	72	183	78	198	11290	5121
CC240 - 11ST	24	24	7	350	1325	186	473	80	203	78	198	12286	5573
D280 - 11ST	28	32	9	420	1590	218	554	72	183	78	198	13070	5929
DD280 - 11ST	28	32	9	420	1590	218	554	80	203	78	198	14068	6381
D320 - 11ST	32	32	9	420	1590	218	554	72	183	78	198	14350	6509
DD320 - 11ST	32	32	9	420	1590	218	554	80	203	78	198	15346	6961

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Unit-mounted Hydraulic Control Manifolds

HYDRAULIC CONTROL MANIFOLDS
The Hydraulic Control Manifold provides safe, dependable operation for control of the BOP stack utilizing sub-plate mounted control valves. Separate circuits provide independent pressure regulation and control for the annular preventer and for the ram and gate valve functions.

The manifold functions are supplied through the 3 inch machined manifold rated for 5,000 PSI WP The internal override feature of the Regulator permits immediate 3,000 PSI accumulator pressure to the manifold, doubling the closing force on the rams in event of an emergency. The manifold directional control valves and outlet piping to the preventers are rated for 5,000 PSI working pressure. These manifolds are available with rugged, mud pump style or glycerin-filled, panel mounted, direct reading gauges indicating manifold regulated, annular regulated and accumulator pressures.

The manifold selected with either the manifold regulator internal override or bypass valve can be supplied with 5,000 PSI pressure for testing or extreme well control problem when air pumps assemblies with hydro-pneumatic valve by passes are selected.

Hydraulic Control Manifold

Unit Mounted Hydraulic Control Manifold

Model Number Identification System

CM	B	7	M	10	P	10
CM Control Manifold Unit MTD PM-Control manifold Panel MTD	Manifold Regulator Bypass B - Bypass Valve	Number of Functions 7-Total (6 Manifold & 1 Annular)	Manifold Regulator Control M - Manual P - Pneumatic H - Hydraulic	Manifold Regulator Port Size 10 - 1" 15 - 1/2"	Annular Regulator Control P - Pneumatic Motor H - Hydraulic Motor	Annular Valve and Regulator Port Size 10 - 1" 15 - 1-1/2"

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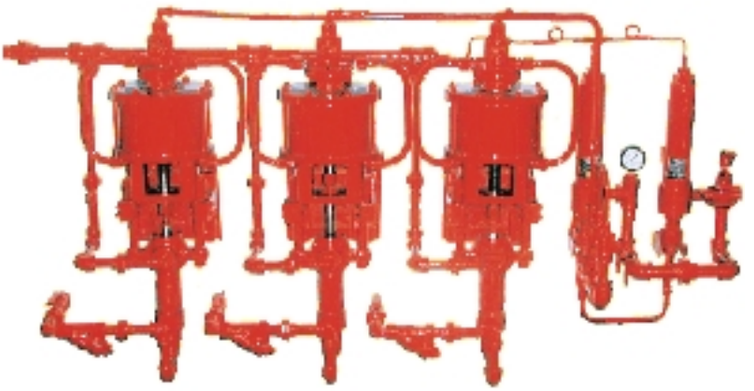
Air Pump Assemblies

Air operated pump modules are used to provide high pressure fluid energy to charge the accumulators and operate the BOP stack functions. When used in conjunction with electric pump modules, compliance is met with the requirements of API Specification 16D Air pump modules provide various options to meet your exact specifications and economic requirements.

The design performance ratios offered by Sara are engineered so that the rig air supply system is not overburdened and, in the event of low rig air pressure, the air operated pumps can still attain the hydraulic system operating pressure of 3,000 PSI.

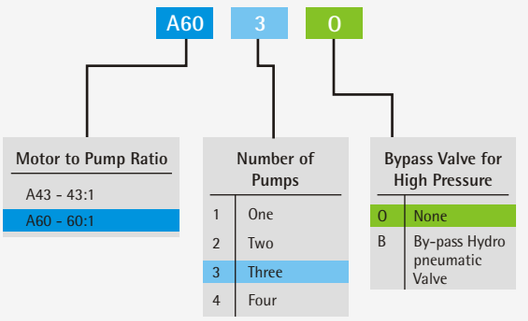
The air pump modules have a hydro-pneumatic pressure switch which is set to stop the pumps at 2,900 PSI. The pumps will automatically start again when the system pressure falls approximately 400 PSI.



Air Operated Pump Modules

Air Operated Pump Modules

Model Number Identification System



Model Number	Number of Pumps	Approximate Flow @ 3,000 PSI						Approximate Dimensions						Approximate Dry Weight	
		1,200 PSI		2,000 PSI		3,000 PSI		Length		Width		Height			
		GPM	LPM	GPM	LPM	GPM	LPM	inches	cm	inches	cm	inches	cm	lbs.	Kg.
A60-1-0	1	6.0	22.7	5.0	18.9	3.9	14.7	46	117	12	30	38	97	145	66
A60-2-0	2	12.0	45.4	10	37.8	7.8	29.5	62	157	12	30	38	97	226	103
A60-3-0	3	18.0	68.1	15	56.7	11.7	44.2	78	198	12	30	38	97	308	139

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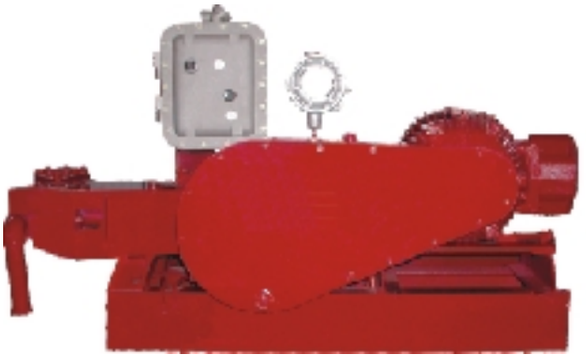
Electric Pump Assemblies

The electric motor driven pump module is the primary source for generating the hydraulic energy which is stored in the accumulators to operate the BOP stack functions. These pumps are offered in a variety of options and operating voltages to meet the specific requirements prescribed in API Specifications 16D.

Standard electric pump modules manufactured by Sara are designed for operation in Class 1, Group D, Division-1 hazardous locations. Only electrical components that meet NEMA, NEC and UL specifications are selected for these applications.

The electric pump modules are set to automatically stop when system pressure reaches 3,000 PSI and start again when system pressure drops to 2,700 PSI, maintaining pressure in the accumulators from 1,500 to 1,800 PSI above the minimum operating pressure of 1,200 PSI.

Electric pump modules are sized to close the specific annular presenter in use by the customer and to open the hydraulic-actuated choke valve within two minutes (with the accumulators blocked) or to charge the accumulators from minimum pressure to 3,000 PSI in fifteen (15) minutes or less.



Conventional Electric Motor Driven Pump

Electric Motor Driven Triplex Pump Modules

T	H	25	C	C	D1

Pump
- T - Triplex

Motor Configuration
- H - Horizontal
- V - Vertical

Motor/Engine

10	10 HP
15	15 HP
20	20 HP
25	25 HP
30	30 HP
40	40 HP
50	50 HP
60	60 HP

Pump Series
- C - Chain Drive
- B - Belt Drive

Operational Voltage
- A - 230 V
- B - 280 V
- C - 460 V
- D - Special

Hazardous Area Classification
- D1 - Division 1
- D2 - Division 2
- SA - Safe Area

Model Number	Horse Power	Plunger Size	Approximate Flow @ 3000 PSI		Approximate Dimensions						Approximate Dry Weight	
					Length		Width		Height			
			GPM	LPM	Inches	cm	Inches	cm	Inches	cm	lbs.	Kg.
TH10CCD1	10	5/8	4.2	15.8	57	145	27	69	34	86	880	400
TH15CCD1	15	3/4	6.1	23.0	57	145	27	69	35	89	950	431
TH20CCD1	20	7/8	8.2	33.6	68	173	27	69	36	91	1000	454
TH25CCD1	25	1	10.7	40.8	68	173	29	74	39	99	1130	513
TH30CCD1	30	1	12.2	46.1	68	173	44	112	44	112	1400	636
TH40CCD1	40	1¼	17.0	64.3	75	190	47	119	47	119	1800	817
TH50CCD1	50	1¼	19.7	74.5	75	190	47	119	47	119	1900	863
TH60CCD1	60	1?	23.9	90.4	78	198	49	124	49	124	2330	1012

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Remote Control Panels

Remote control panels allow the main accumulator unit with its hydraulic control manifold to be located at a safe distance from the rig floor and yet provides full control of the BOP stack, easily accessible to the driller. Every rig is required to have at least one remote control panel in order to comply with API specification 16D.

A second remote panel is recommended near the escape exit or in a safe location where the BOP stack can be controlled should the drilling crew have to evacuate the drill floor.

Remote control panels located at the driller's station should be capable of operating every BOP stack function, controlling regulated pressure of the annular preventer for stripping operations and also capable of immediately switching from regulated pressure to full accumulator pressure to the ram preventers should additional closing force be required during extreme well control problems. The driller's remote panel should include gauges or meters for remote indication of the various operating pressures and open/close status of the manifold control valve positions.

Air purge and explosion-proof panels meet NEC Class 1, Group D, Division 1 requirements for hazardous environments.

PLC based panels are equipped with a color touch screen for display and are available in wireless configurations not requiring air hose or electric cable.

Specifications for various standard models shown. Other models are available upon request.

Smart Control Panel

Conventional Air Remote Panel

Unit Mounted Hydraulic Control Manifold

Model Number Identification System

G	ER	B	7	AP	D1

Function Identification Type

N	Name Plate
G	Graphic

Operation

AR	Air with annular control and pressure readouts
AO	Air without annular control and pressure readouts
ER	Electric with annular control, alarms and pressure readouts
EO	Electric without annular control, alarms and pressure readouts

Manifold Regulator Bypass

B	Bypass

Number of BOP Stack Functions

7	Total (6 manifold & 1 Annular)

Panel Type

FC	Free-Standing Cabinet
AP	Air-Purge Enclosure
WP	Weather Proof Enclosure
XP	Explosion Proof

Hazardous Area Classification

D1	Division 1
D2	Division 2
SA	Safe Area
NR	Not Rated

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by the RVA

API 16D

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