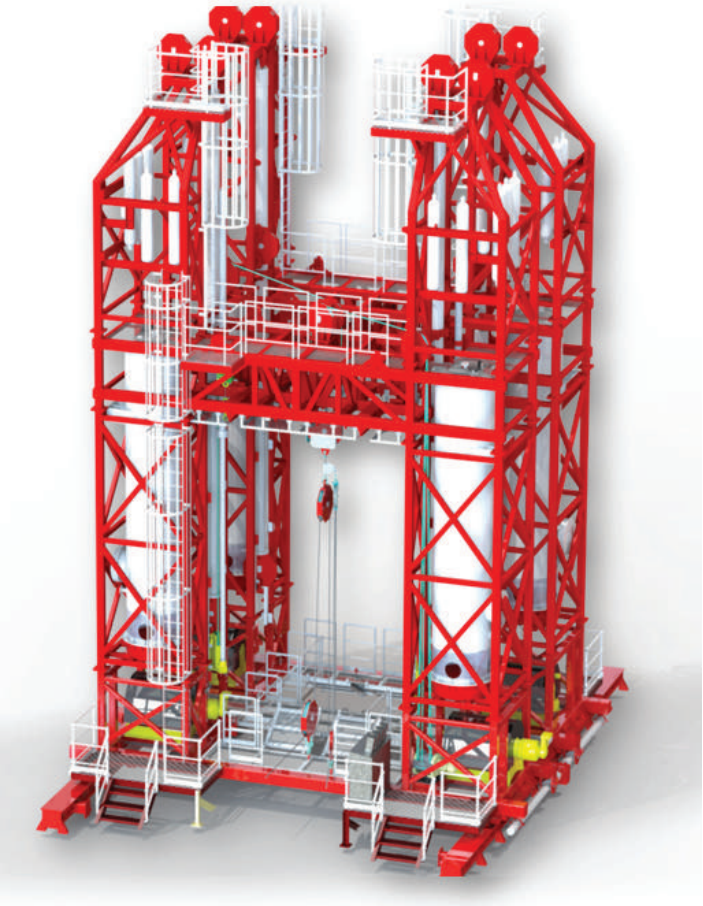
SapuraKencana
PETROLEUM
Well Services



Intervention Compensation System (ICS)

Constant tension guide wire and heave compensation system

SapuraKencana Well Services' Intervention Compensation System (ICS) is a modular frame which provides four guide wires and a compensated deployment sheave to enable the deployment of umbilicals and tools to the subsea well. This field proven system was designed and built under full DNV survey and classed as an offshore crane.

The ICS comprises two separate H-frames, each with two hydro-pneumatic guide wire tensioning systems, which can be deployed over a vessel's moonpool or over the side/stern. Within one of the frames, the heave compensation system uses one of the guide wires as a reference line. The heave compensation can be brought in and out of heave compensation by remote operation. Both frames are equipped with a central padeye to facilitate clump weight deployment.

For deepwater applications the two unitised frames can be mounted at a larger spacing to facilitate separation between umbilicals and wire line activities and reduce the risk of entanglement.

The ICS is designed to be installed onto a work vessel that has a heave compensated crane sufficiently rated to deploy the intervention lubricator packages. The modular frames have been developed for ease of road transport and shipping, and can be loaded to a vessel with a single lift during mobilisation.

CERTIFICATION AND DESIGN CODES

Structures	:	Full design review under DNV 2.22 (classed as an offshore crane) and fabricated under full DNV survey
CT cylinders	:	DNV Standard for Certification No. 2.9 TAP hydraulic cylinders manufactured under full DNV survey
Skidding & HC deactivation cylinders	:	DNV Standard for Certification No. 2.9 TAP hydraulic cylinders manufactured under full DNV survey
HC-lowering winch	:	ABS and LR type approved with an LR witness test
Air receivers	:	Designed to ASME VIII div 1, design DNV reviewed, manufactured under full DNV survey, WorkSafe regulations
GW winches	:	DNV type approved (DNV2.22), with a DNV witness test

DIMENSIONS AND CAPACITY

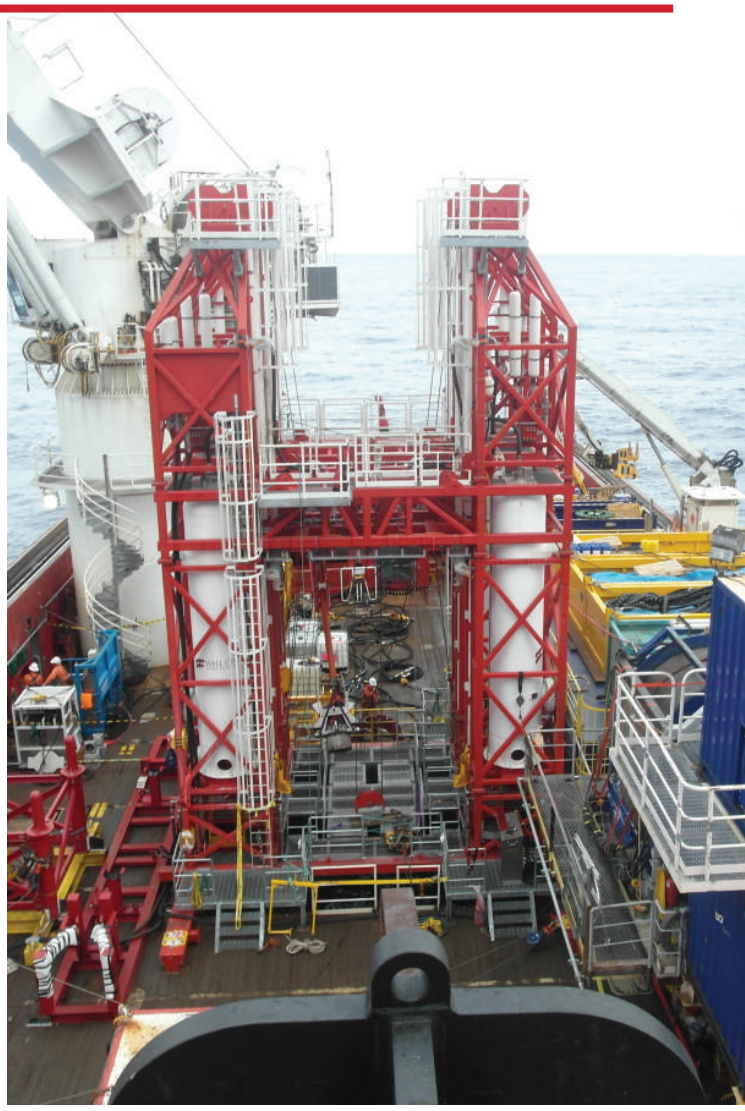
General

Guide wire units (GW)	:	4 x constant tension (API centres)
Stroke	:	8 m
Max. GW tension	:	6 t
Max. out of service load	:	10 t
Min. tension	:	1 t
Wire storage capacity	:	1,100 m
Wire rope	:	19 mm
Maximum heave velocity	:	2 m/s
Design water depth	:	850 m
Heave compensation system		
Type	:	Passive
Max. capacity	:	4,000 kg
Min. capacity	:	200 kg
Moon pool size		
Maximum	:	7.2 m x 7.2 m
Minimum	:	5 m x 5 m
Corrosion protection		
Frame	:	carboline two pack (3 coats)
Walkways	:	hot dip galvanised
Hydraulic pipes & fittings	:	SS316

DIMENSIONS AND CAPACITY (cont)

Structure

Dimensions		
Overall Height	:	14.5 m (from deck level)
Overall Width	:	8 m
Overall Length	:	11.5 m
Skidding system (moonpool access)		
Stroke	:	2.5 m (per frame)
Force	:	30 t (per frame)
Design Temperature	:	0 °C
Wind Velocity		
Operational	:	24 m/s
Out of service	:	44 m/s
Mass		
Frame 1	:	46 t
Frame 2	:	53 t
Skidding beams	:	8 t
Work platform	:	2.5 t
Umbilical Support	:	Up to 1.6m radius umbilical sheave



ICS MAIN COMPONENTS

CT Cylinder (Hydro-Pneumatic)

Stroke	:	4 m
Over travel cushion	:	Yes, air
Recoil mechanism dashpot	:	Adjustable hydraulic
Normal velocity	:	1 m/s (equivalent to 2 m/s heave velocity)
Free-fall (wire break) velocity	:	limited to 1.3 m/s

GW Winch

IR FA7Ti x 4

Main Lifting Point

Dynamic Capacity	:	120 t (reeved)
SWL	:	40 t
Dynamic factor	:	1.5

Air Receiver

Volume	:	5 m^3
Rated Pressure	:	350 psi
Design Pressure	:	430 psi
PRV	:	Yes
Worksafe Registration	:	Yes

SapuraKencana Well Services
is operated by subsidiaries of SapuraKencana Petroleum

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