



Girassol

Personal Handbook
Subsea Equipment
Manifold and Intervention

FMC Energy Systems **TOTAL FINA ELF**
FMC Kongsberg Subsea

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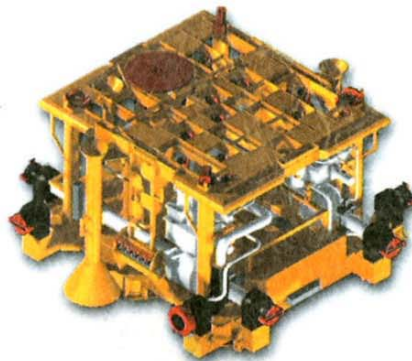
45

INTRODUCTION

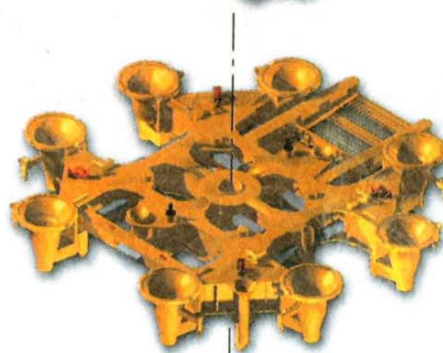
The purpose of the book is only to provide general information on the equipment and it shall not replace the official user documentation as any information may be changed without further notice.

Manifold and Foundation

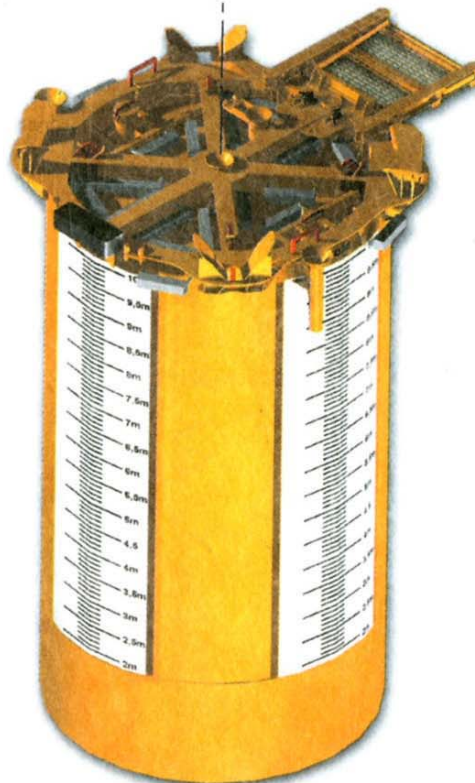
MANIFOLD



MANIFOLD SUPPORT
STRUCTURE (MSS)

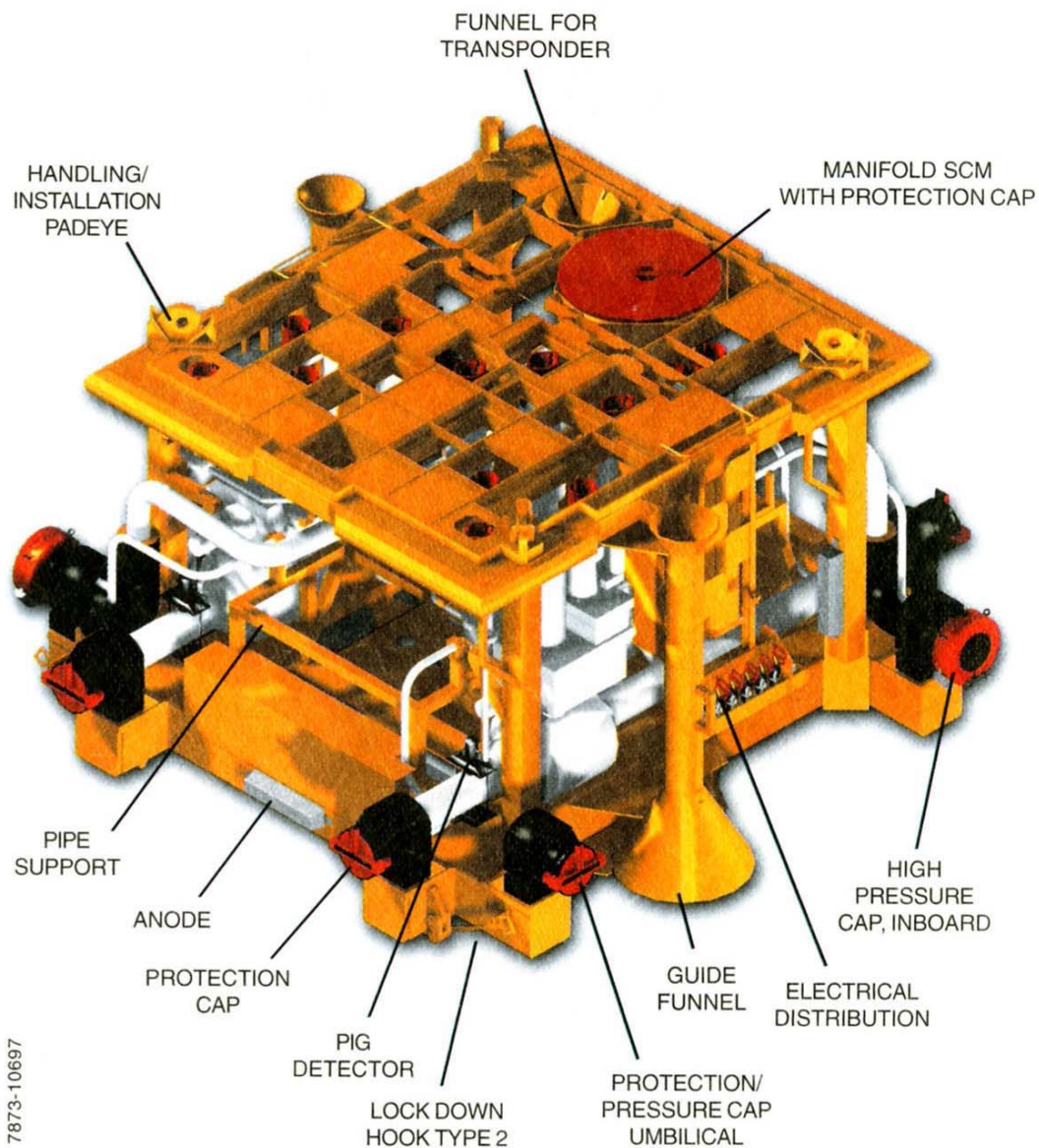


CLOSED CAISSON
FOUNDATION (CCF)

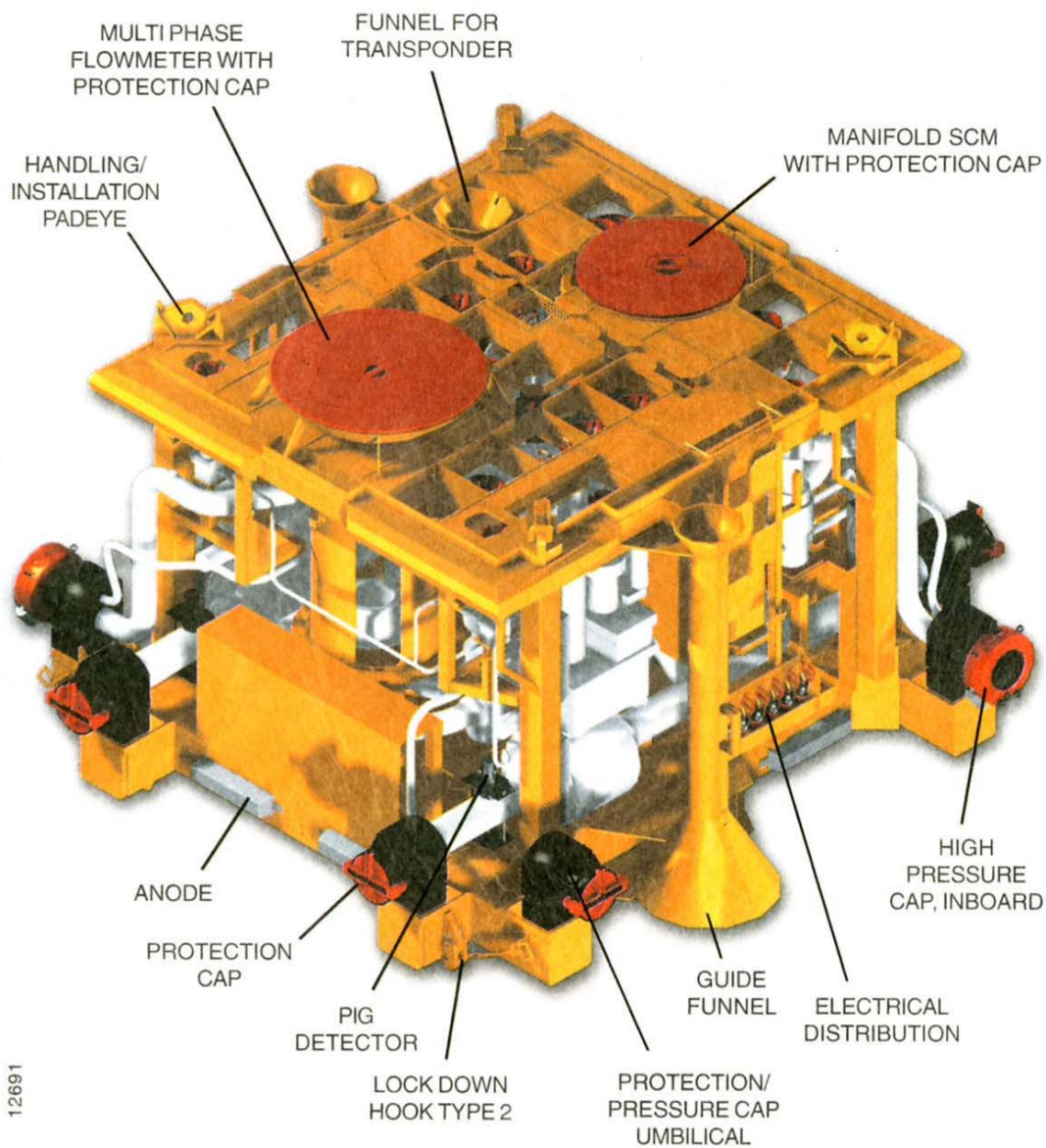


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Manifold and Foundation Overview

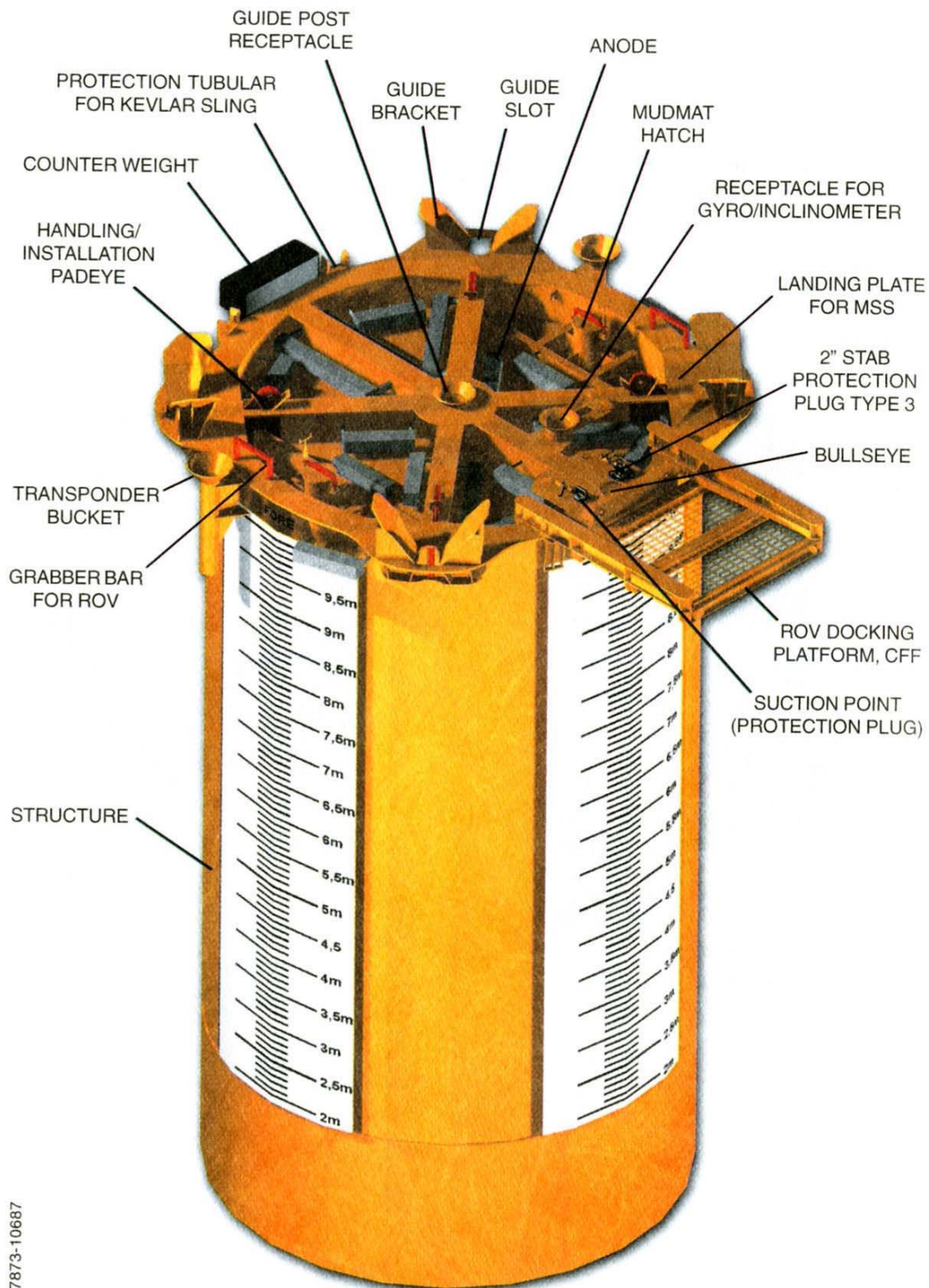


Manifold

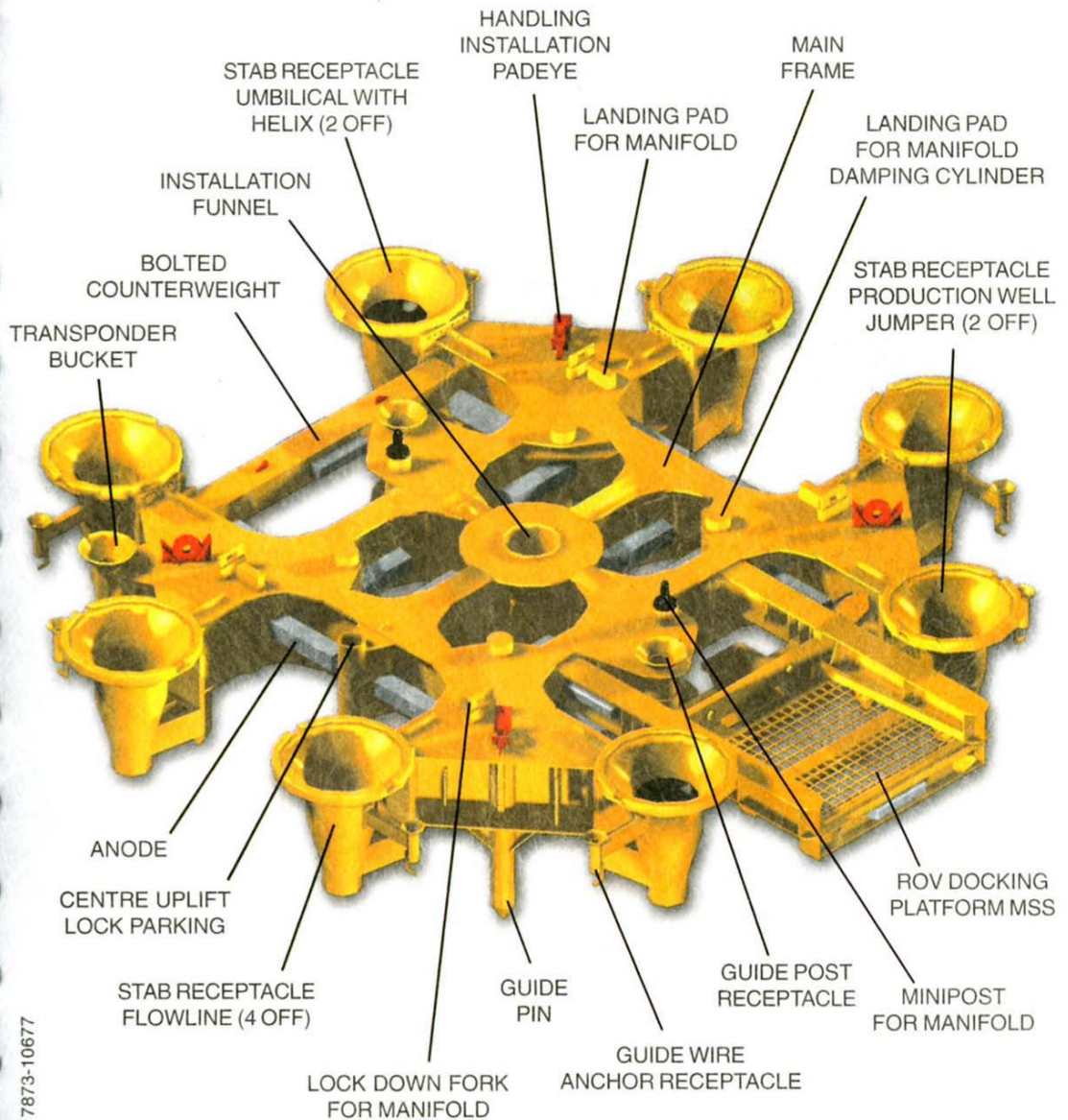


12691

Manifold with MFM

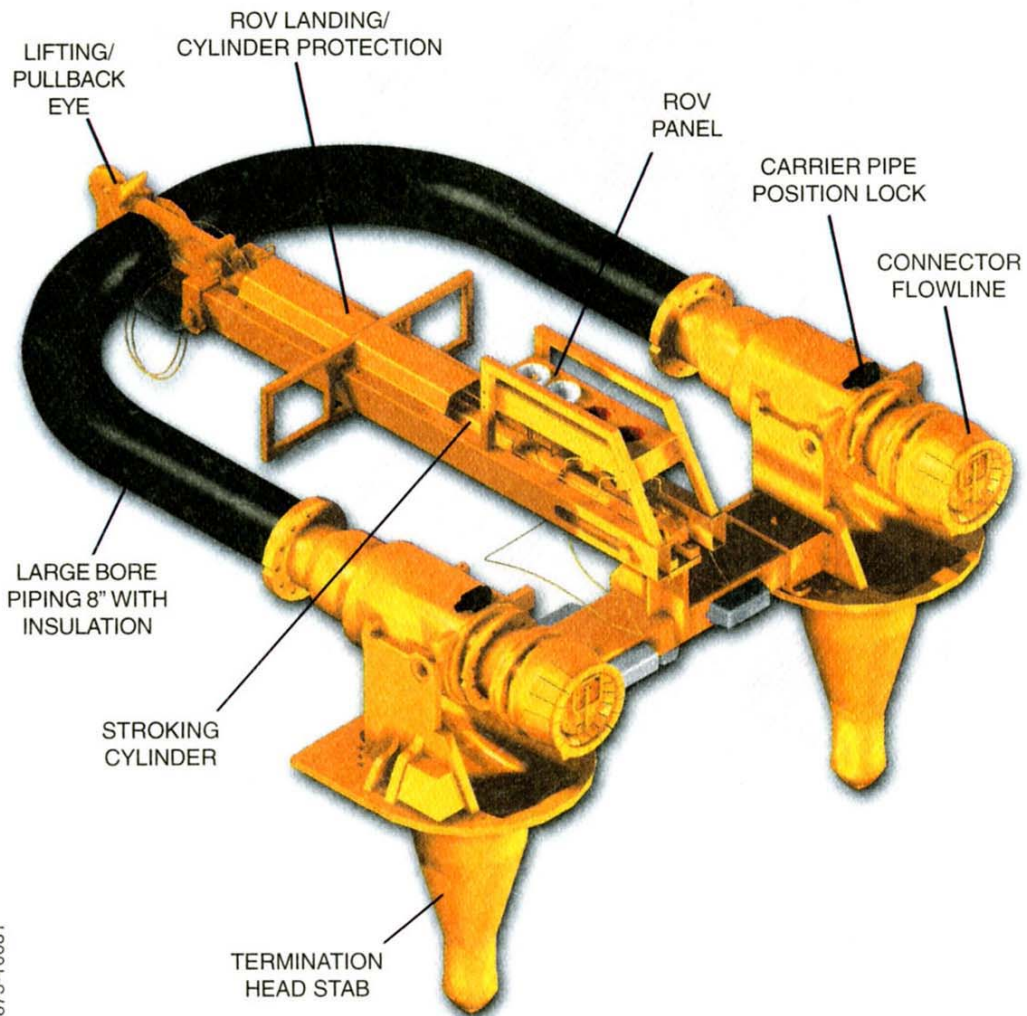


Closed Cassion Foundation (CSS)



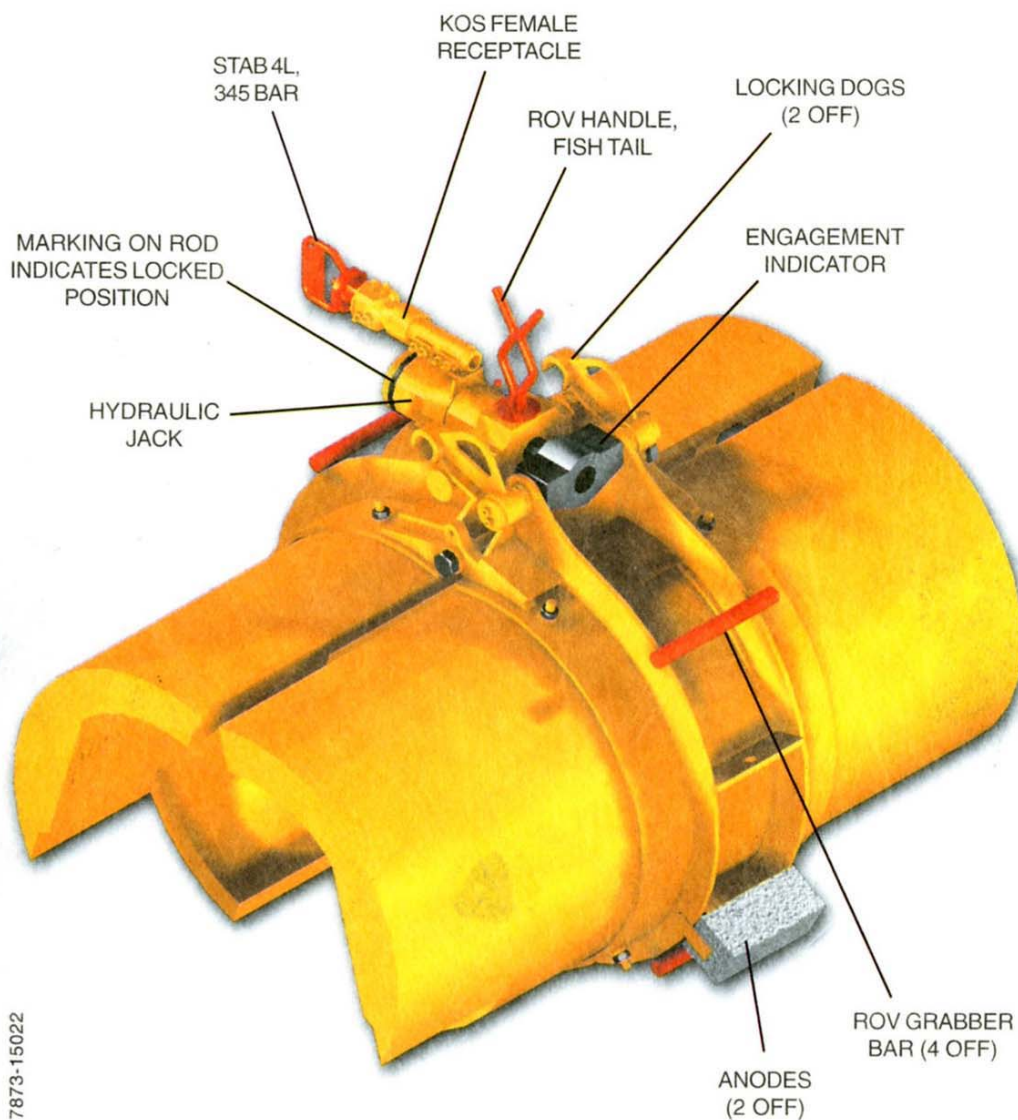
7873-10677

Manifold Support Structure (MSS)



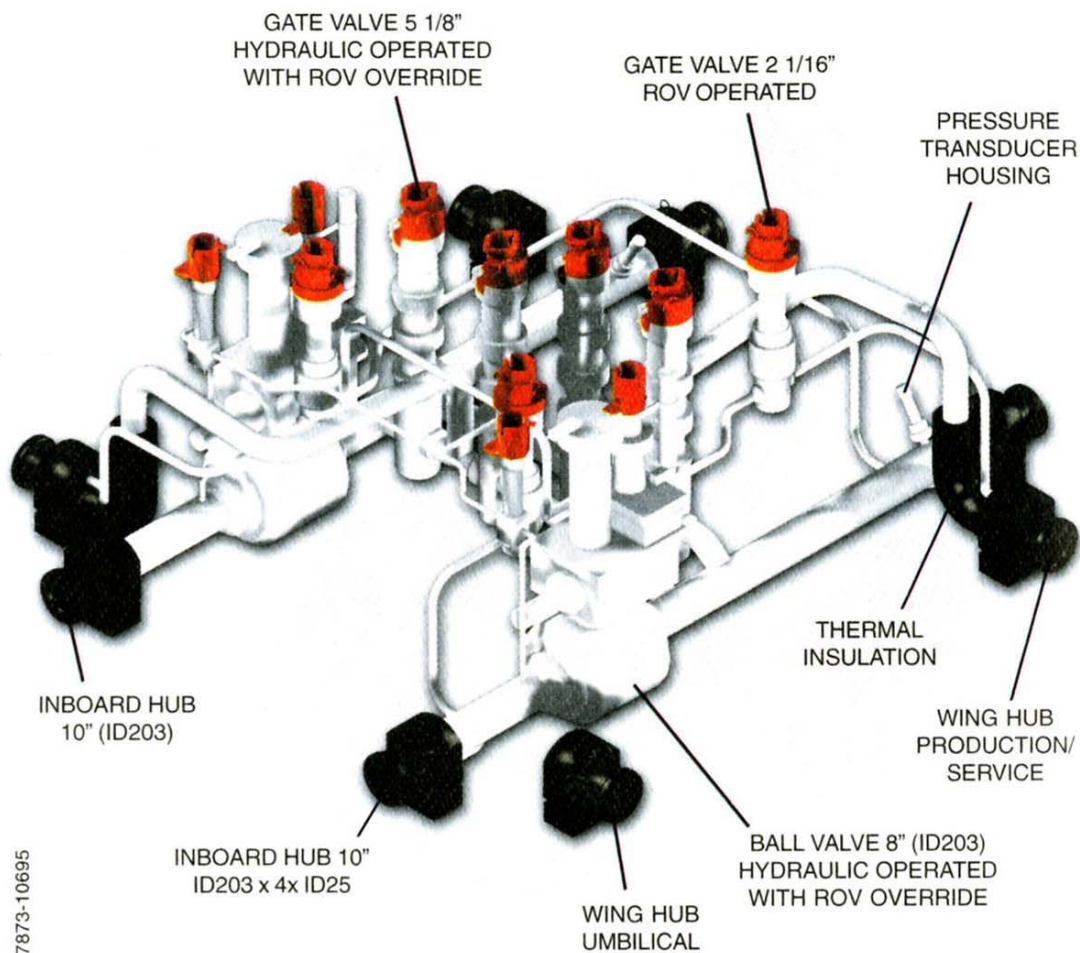
7873-10681

Pig Loop



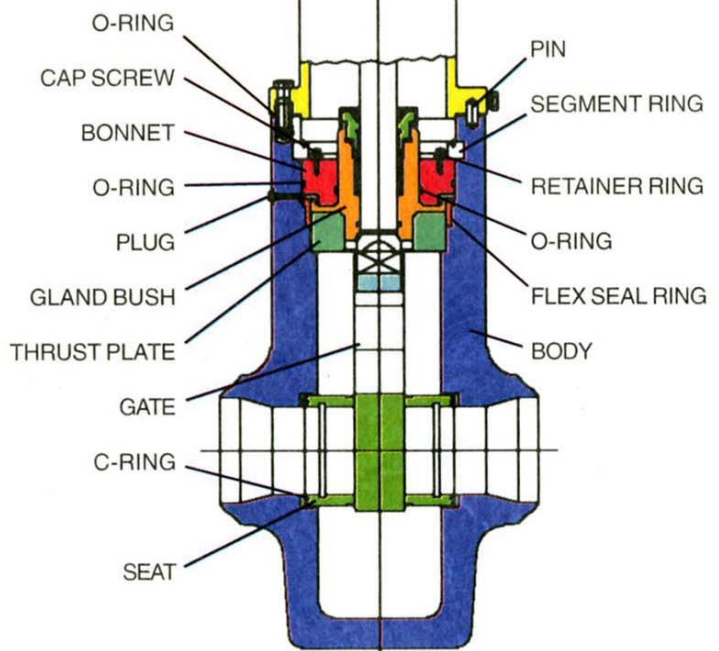
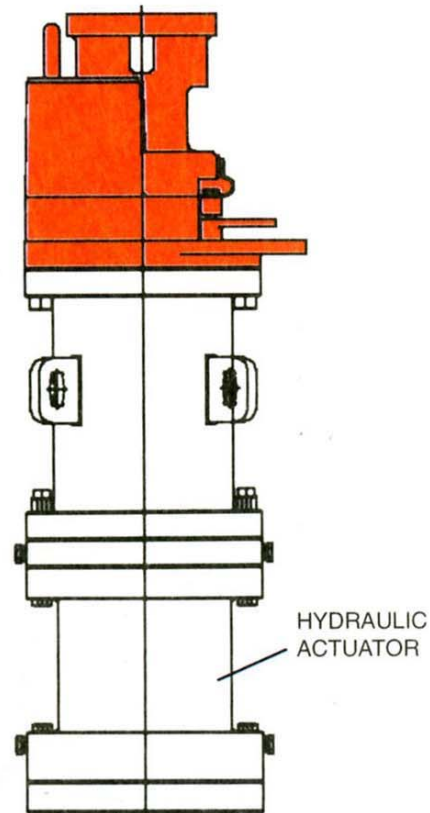
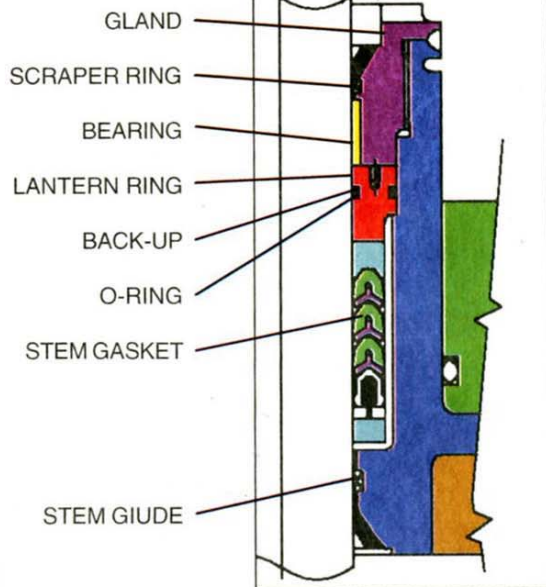
7873-15022

Insulation Cap



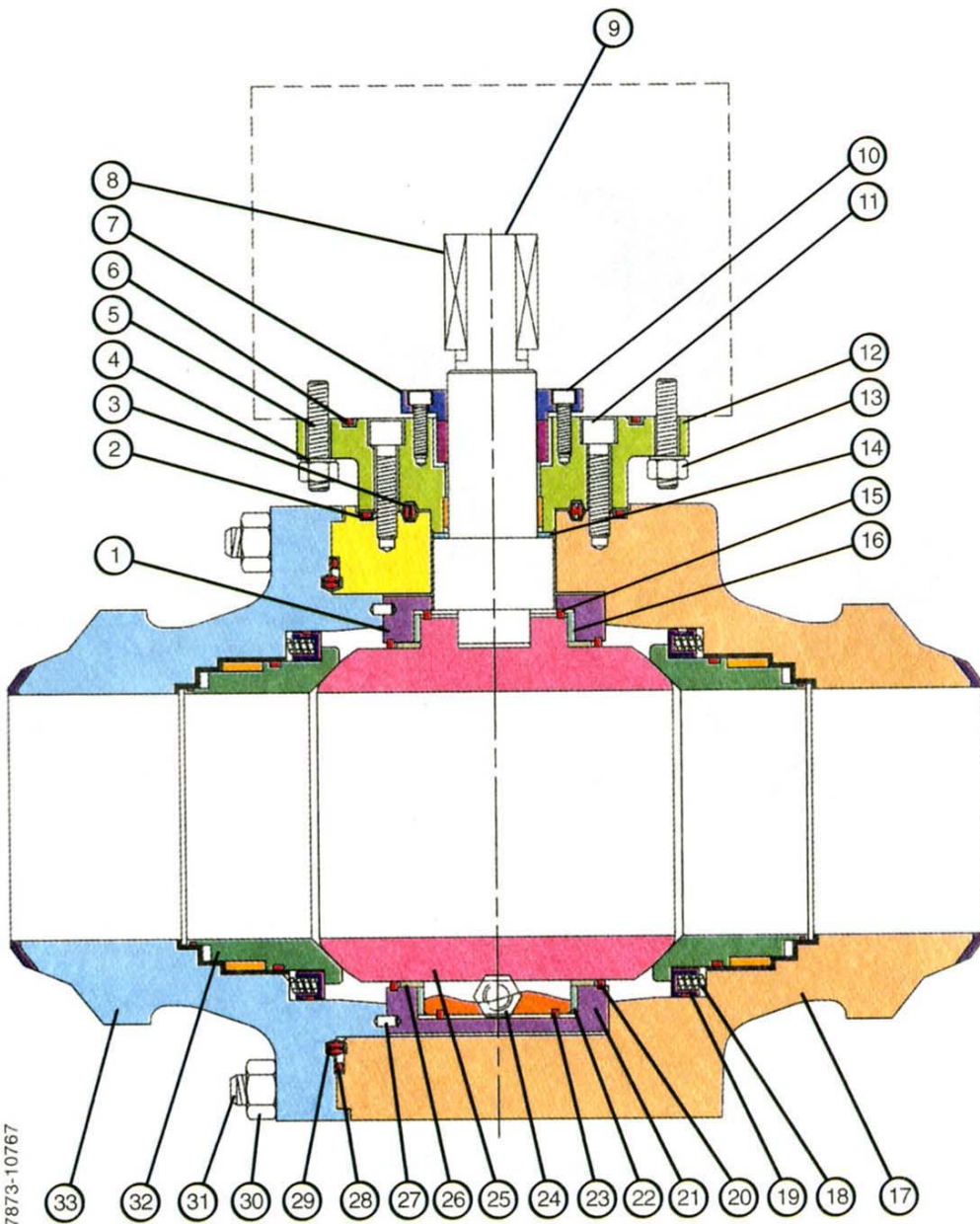
7873-10695

Large Bore, typical



7873-15023

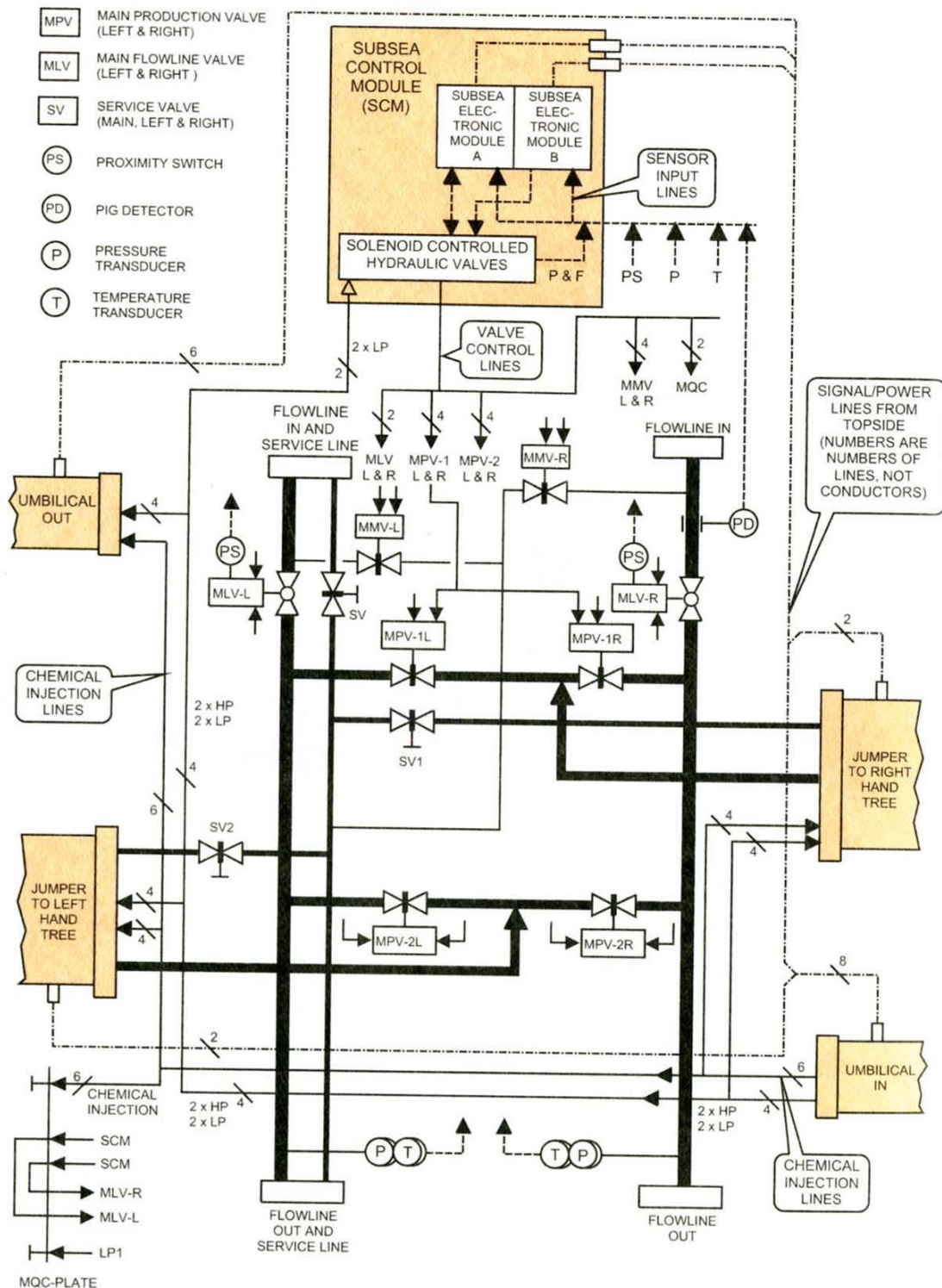
Gate Valve 5 1/8"



7873-10767

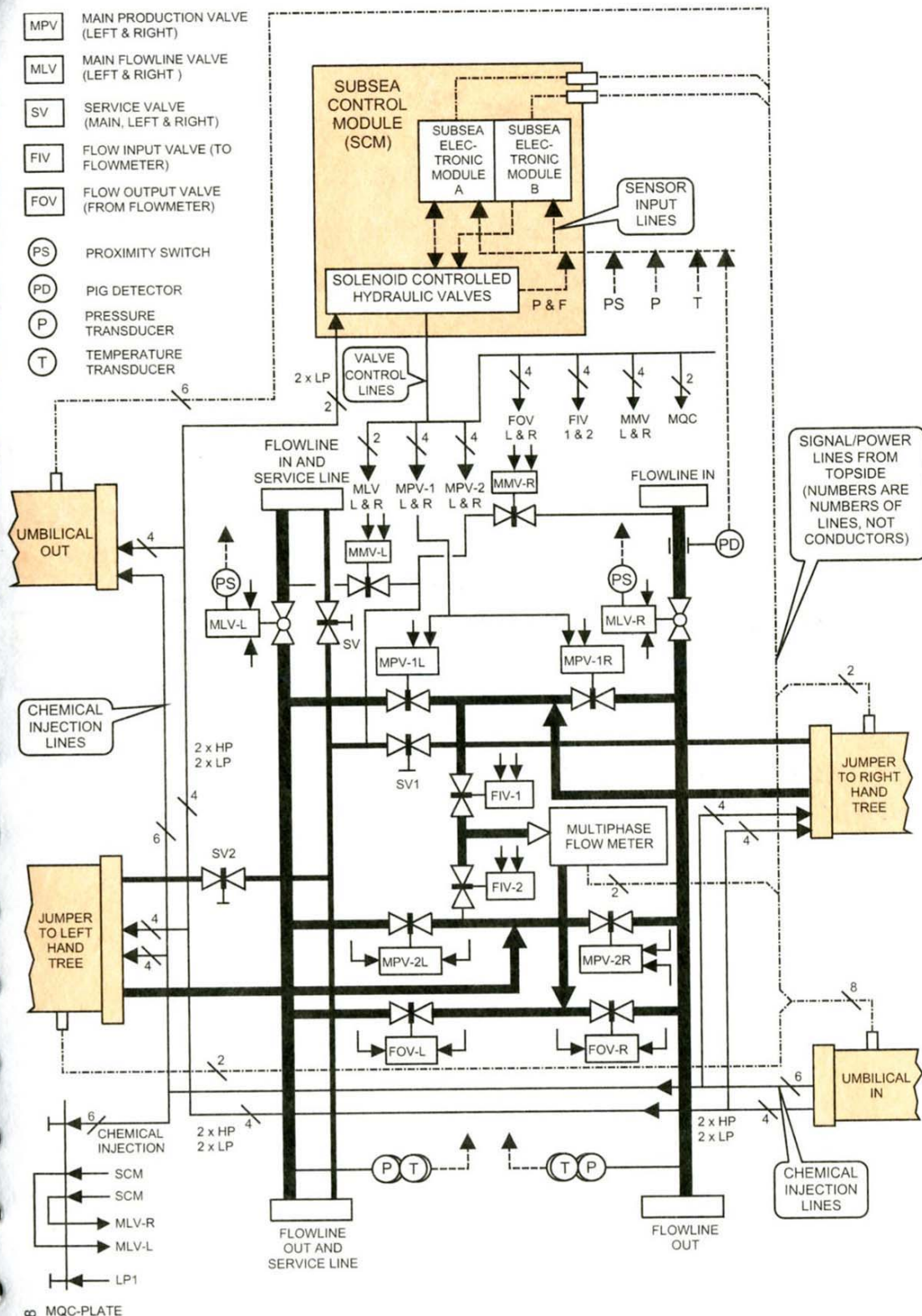
Ball Valve 8"

ITEM	DESCRIPTION
1	Spacer
2	Bonnet O-ring
3	Bonnet Gasket
4	Washer
5	Stud Bolt
6	Gasket
7	Gland Plate
8	Key
9	Stem
10	Cap Screw
11	Cap Screw
12	Bonnet
13	Stud Bolt Nut
14	Thrust Bearing
15	Wiper
16	Upper Stem Bearing
17	Body
18	Spring
19	Spring Holder
20	Wiper
21	Spacer
22	Lower Stem Bearing
23	Wiper
24	Drain Plug
25	Ball
26	Thrust Bearing
27	Pin
28	Flange O-ring
29	Flange Gasket
30	Stud Bolt Nut
31	Stud Bolt
32	Seat Ring
33	Lateral Flange



Manifold Flow Schematic without MFM

- MPV MAIN PRODUCTION VALVE (LEFT & RIGHT)
- MLV MAIN FLOWLINE VALVE (LEFT & RIGHT)
- SV SERVICE VALVE (MAIN, LEFT & RIGHT)
- FIV FLOW INPUT VALVE (TO FLOWMETER)
- FOV FLOW OUTPUT VALVE (FROM FLOWMETER)
- PS PROXIMITY SWITCH
- PD PIG DETECTOR
- P PRESSURE TRANSDUCER
- T TEMPERATURE TRANSDUCER



11558 MQC-PLATE

Manifold Flow Schematic with MFM

MANIFOLD VALVE TYPES

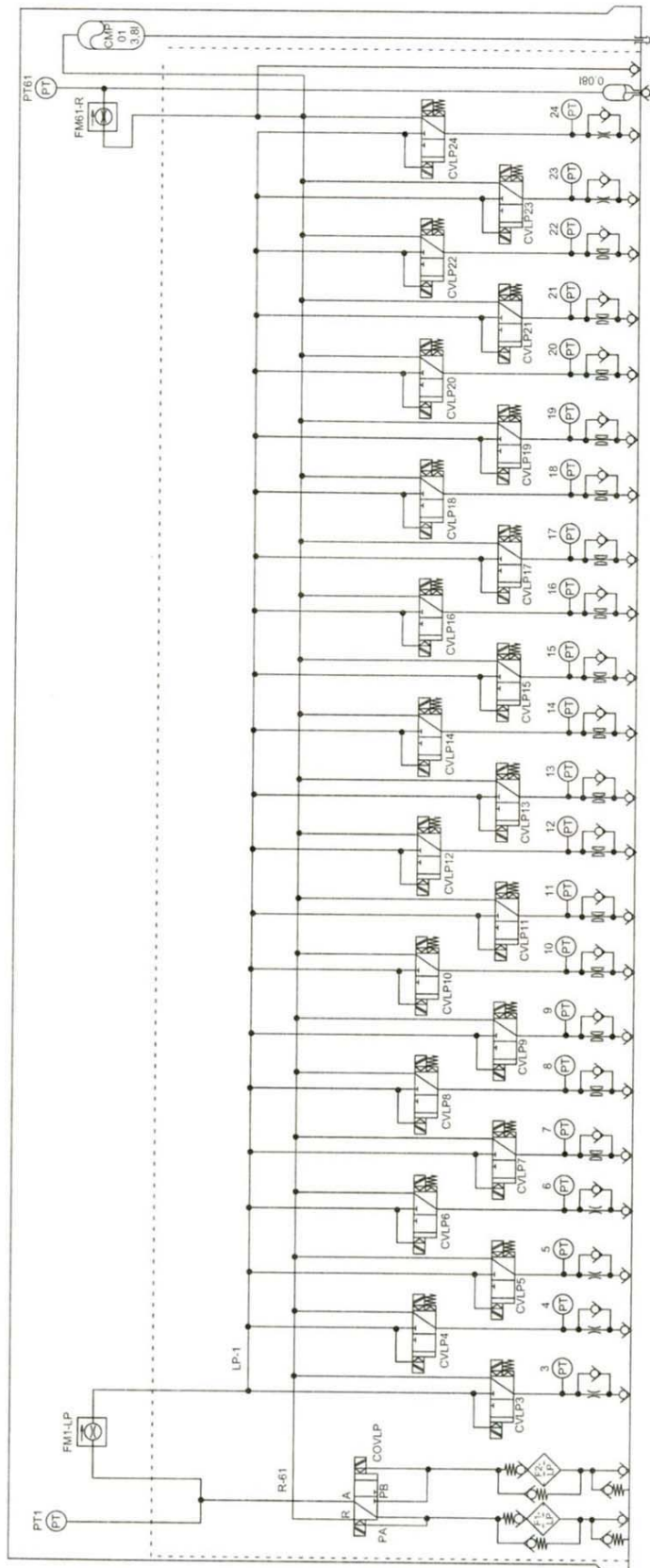
Valve Type	Max ROV Torque Tool Setting	Rec. ROV Torque Tool Setting	From Open Position	Max Breakout Torque:			
				Closing	At Balanced Pressure	At max Diff. Pressure	No. of ROV Shaft Turns
2 1/16"	1700Nm	1500Nm	1200Nm	400Nm	400Nm	345 bar	18
5 1/8"	1700Nm	1500Nm	1200Nm	400Nm	400Nm	270 bar	102
8"	1700Nm	1500Nm	1000Nm	600Nm	1200Nm	270 bar	2

2 1/16" Gate Valve, P/N 7401957 - TDI-0010441

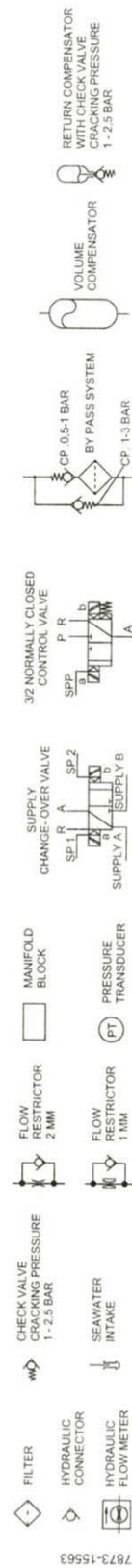
5 1/8" Gate Valve, P/N 7401956 - TDI-0010440

8" Ball Valve, P/N 7401955 - TDI-0010439

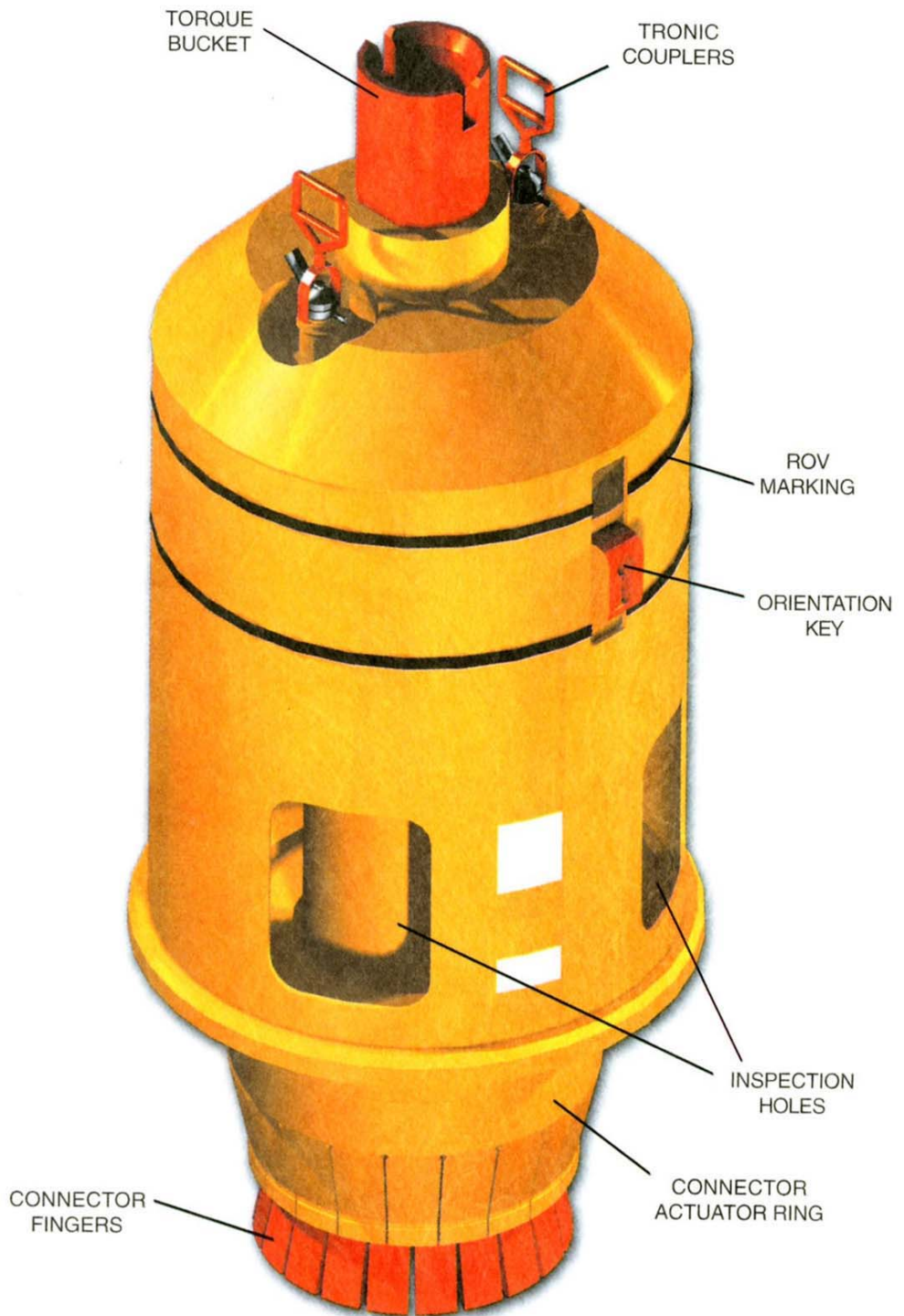
Manifold Valve Types



MANIFOLD WITH MFM	HC1	HC2	HC3	HC4	HC5	HC6	HC7	HC8	HC9	HC10	HC11	HC12	HC13	HC14	HC15	HC16	HC17	HC18	HC19	HC20	HC21	HC22	HC23	HC24	CHKV-61
LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB
LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB
MANIFOLD WITHOUT MFM SUPPLY	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB
MANIFOLD WITHOUT MFM SUPPLY	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB	LPB

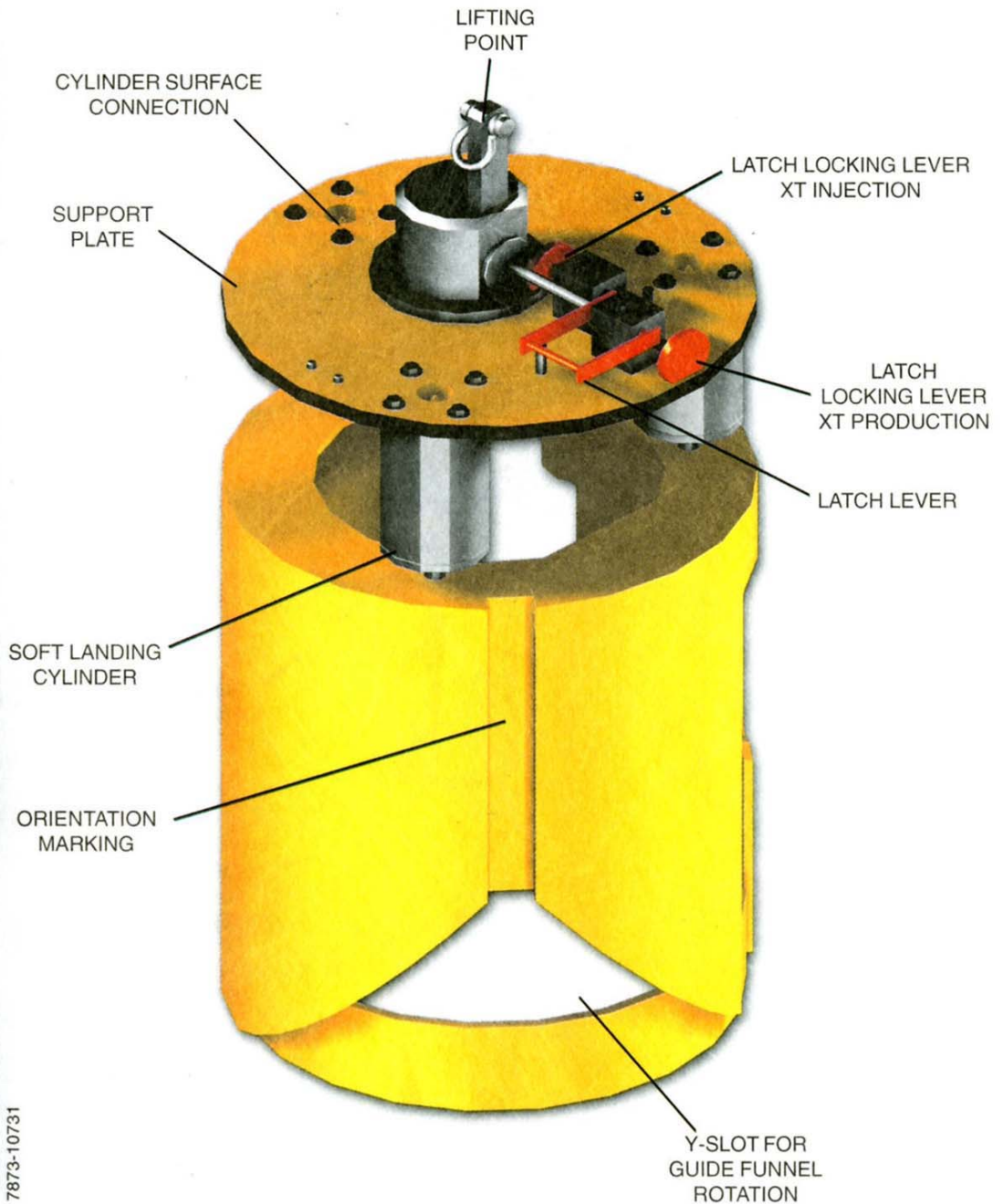


SCM Schematic Manifold



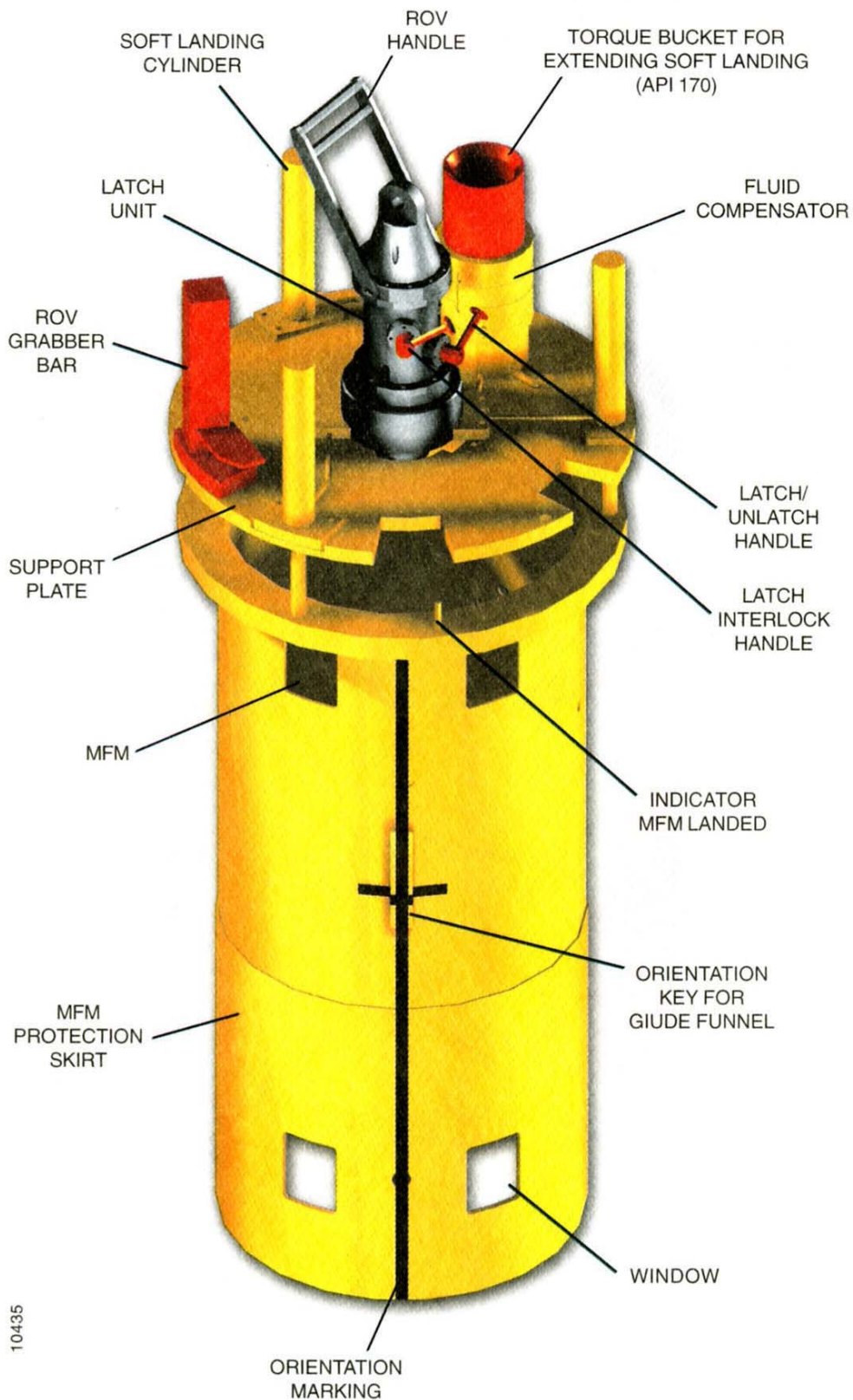
Multiphase Flow Meter (MFM)

Tie-in and Intervention System



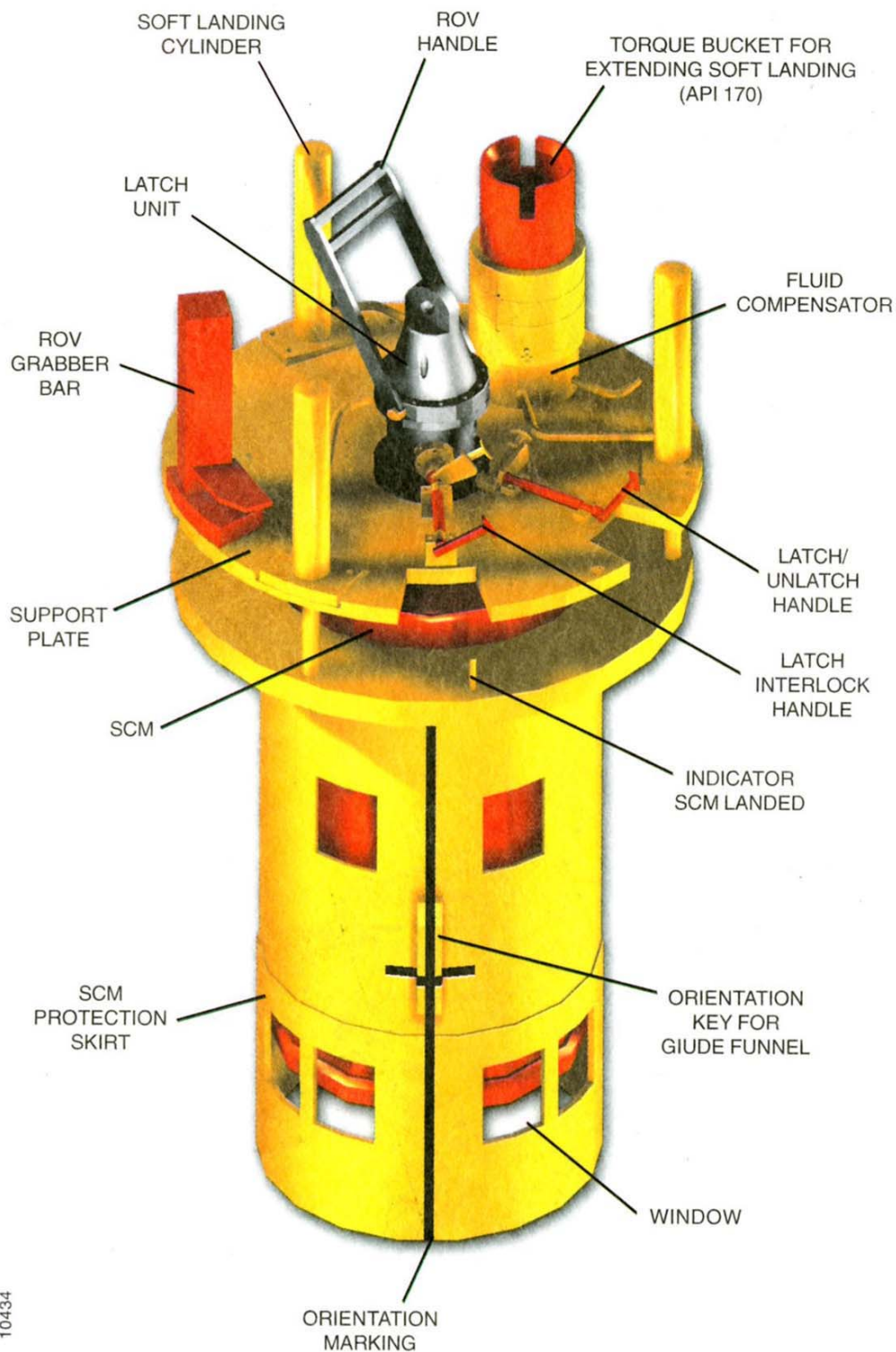
7873-10731

Master Flo Insert Choke Running Tool



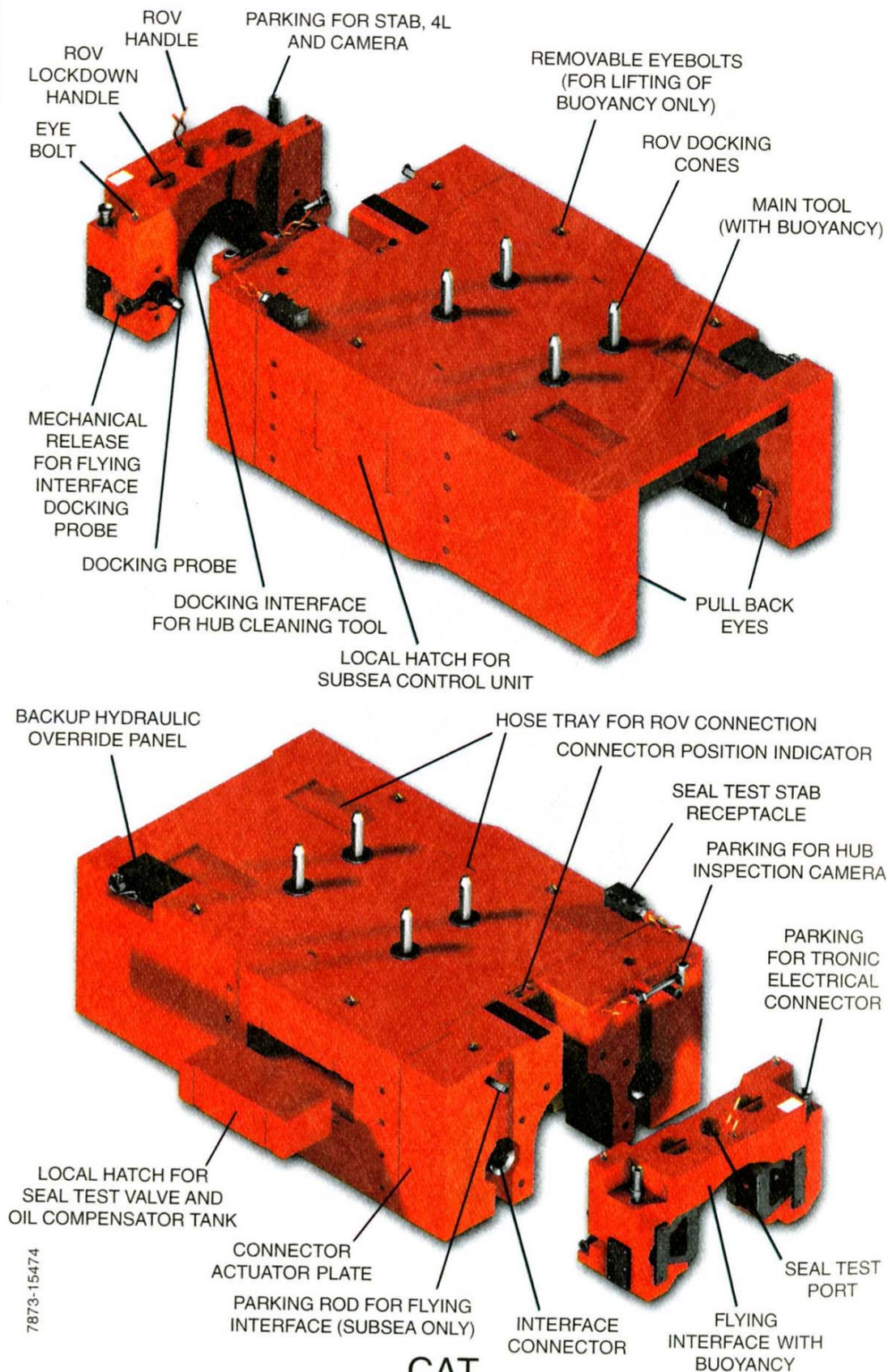
10435

Multifunction Running Tool - Mode MFM

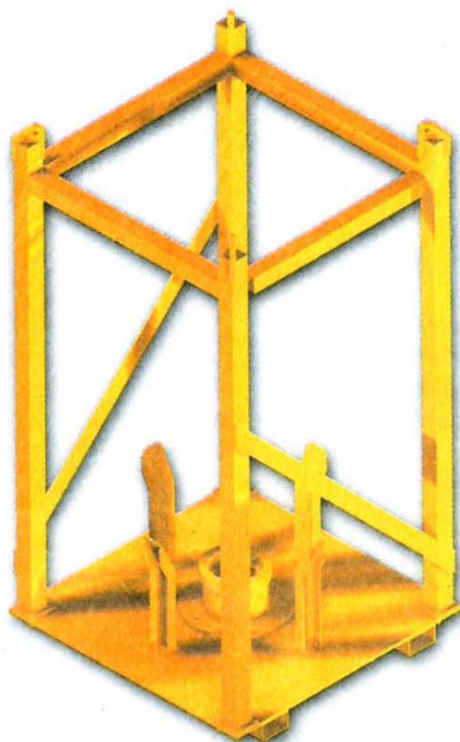


10434

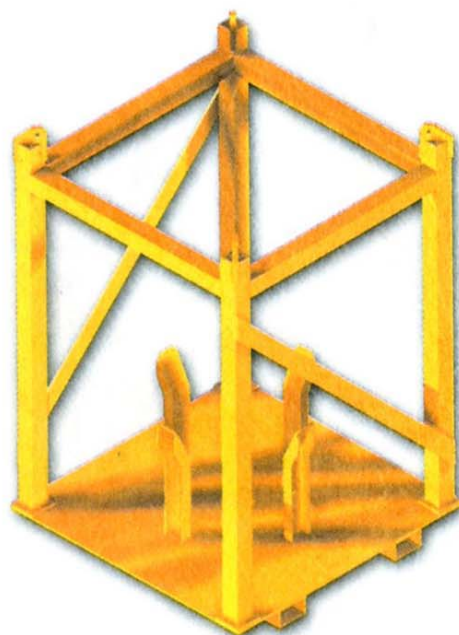
Multifunction Running Tool - Mode SCM



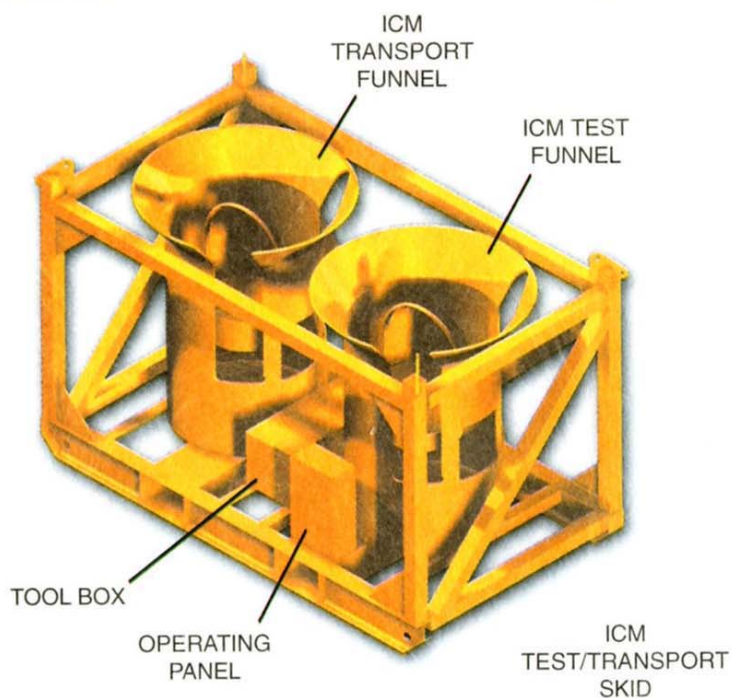
CAT



MRT
HANDLING FRAME
MFM MODE

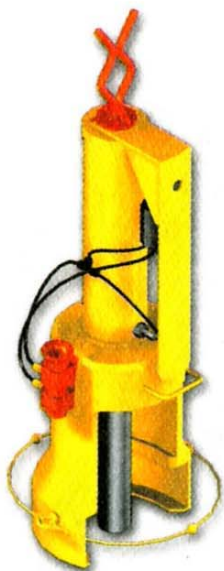


MRT
HANDLING FRAME
SCM MODE



7873-10812

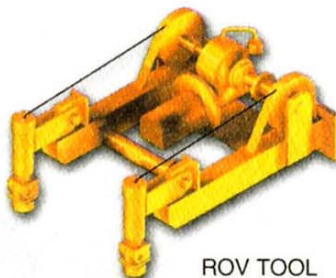
Test and Transport Equipment



OVERRIDE JACK MFM



EXTERNAL SEL
TEST KIT



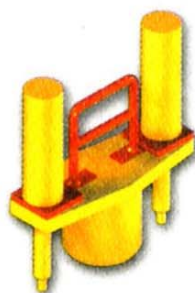
ROV TOOL
ELEVATOR



TORQUE TOOL ,
2700 Nm



STAB 2L,
345 bar



MQC OVERRIDE
JACK, MK2



CALIBRATION STAND
FOR TORQUE TOOL
2700 Nm



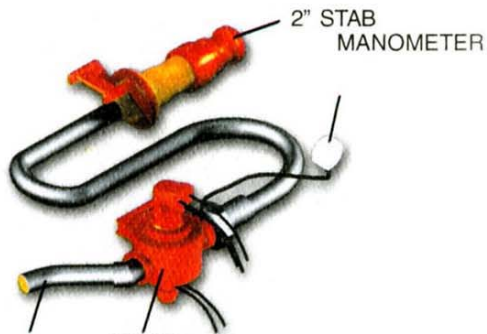
OVERRIDE JACK,
3" CONNECTOR



SCM
OVERRIDE
TOOL



STAB 4L,
345 bar



SUCTION KIT

EXHAUST
HOSE

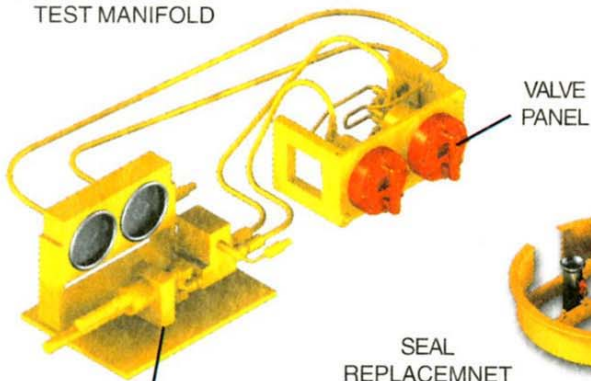
PUMP

2" STAB
MANOMETER

7873-10727_01

ROV Tools

TREE CAP PRESSURE
TEST MANIFOLD



PRESSURE AND
MONITORING UNIT

SEAL
REPLACEMENT
TOOL WELLHEAD
VX 18 1/4"



OVERRIDE JACK,
TH ORIENTATION
PIN



SUCTION
KIT



TUBING HANGER
WASHOUT TOOL

EJECTOR



OVERRIDE
JACK LRP

OVERRIDE
JACK XT



OVERRIDE
JACK EDP



TUBING HANGER
ORIENTATION CHECK TOOL

7873-10727_02

ROV Tools



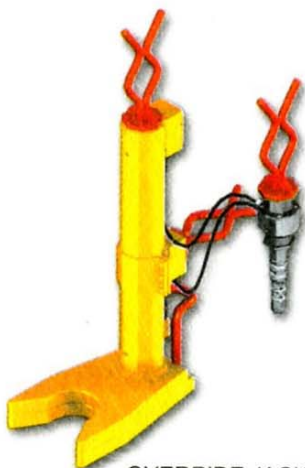
OVERRIDE JACK
TERMINATION HEAD



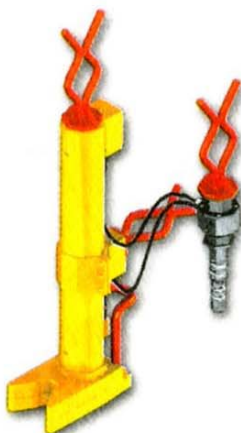
HIGH PRESSURE CAP
REMOVAL TOOL



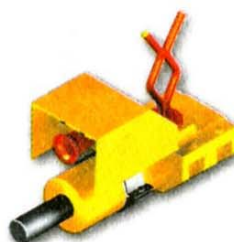
HUB INSPECTION
CAMERA



OVERRIDE JACK
PLM MODE



OVERRIDE JACK
YOKE MODE



HYDRAULIC
JACK, 10,6 TON



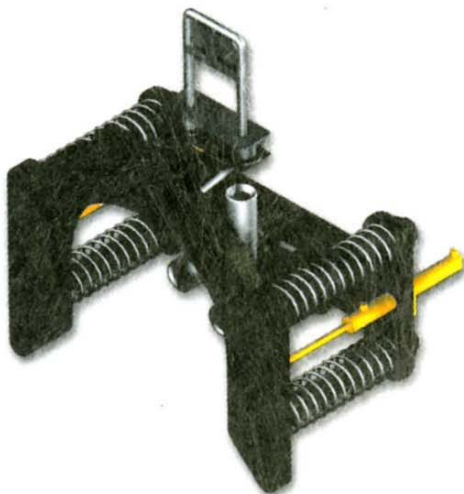
OVERRIDE JACK
CAT FLYING INTERFACE
LOCK DOWN MODE



OVERRIDE JACK
CAT FLYING INTERFACE
DOCKING PROBE MODE

ROV Tools

7873-10727_03



SEAL REPLACEMENT
TOOL



HUB CLEANING TOOL,
8" + 4x1"

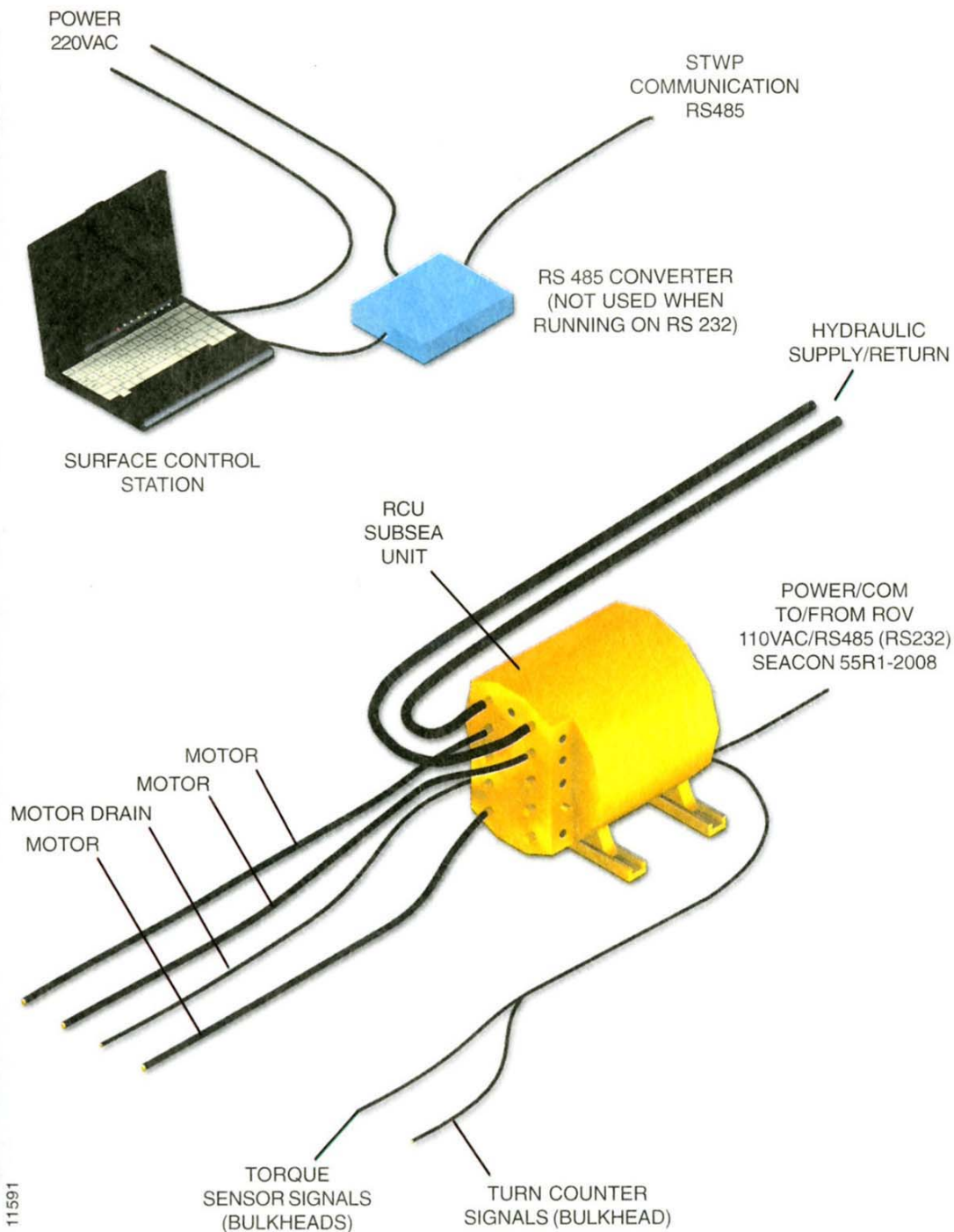


HUB CLEANING TOOL,
MULTIBORE



HUB CLEANING TOOL,
MONOBORE

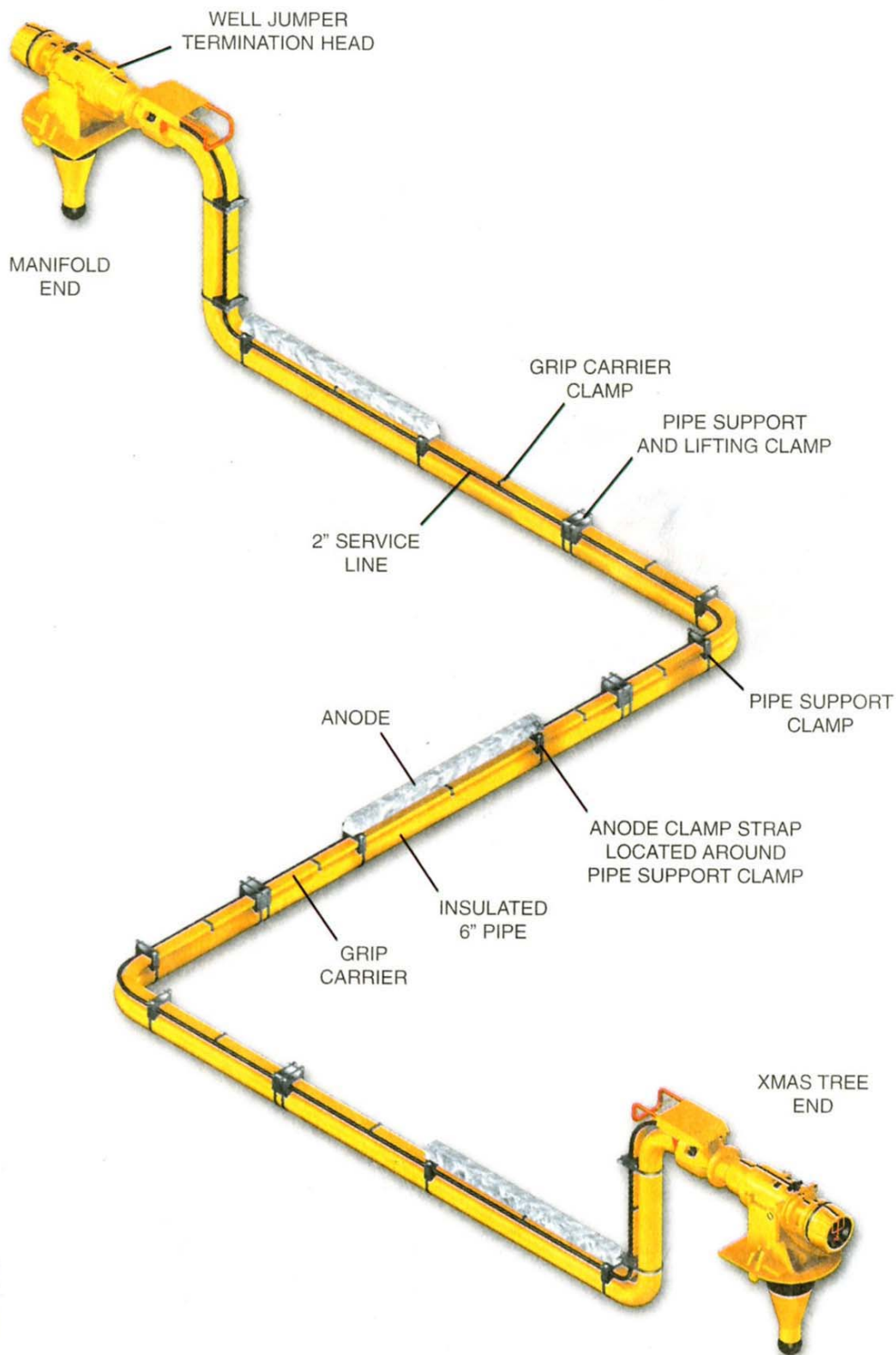
7873-10727_04



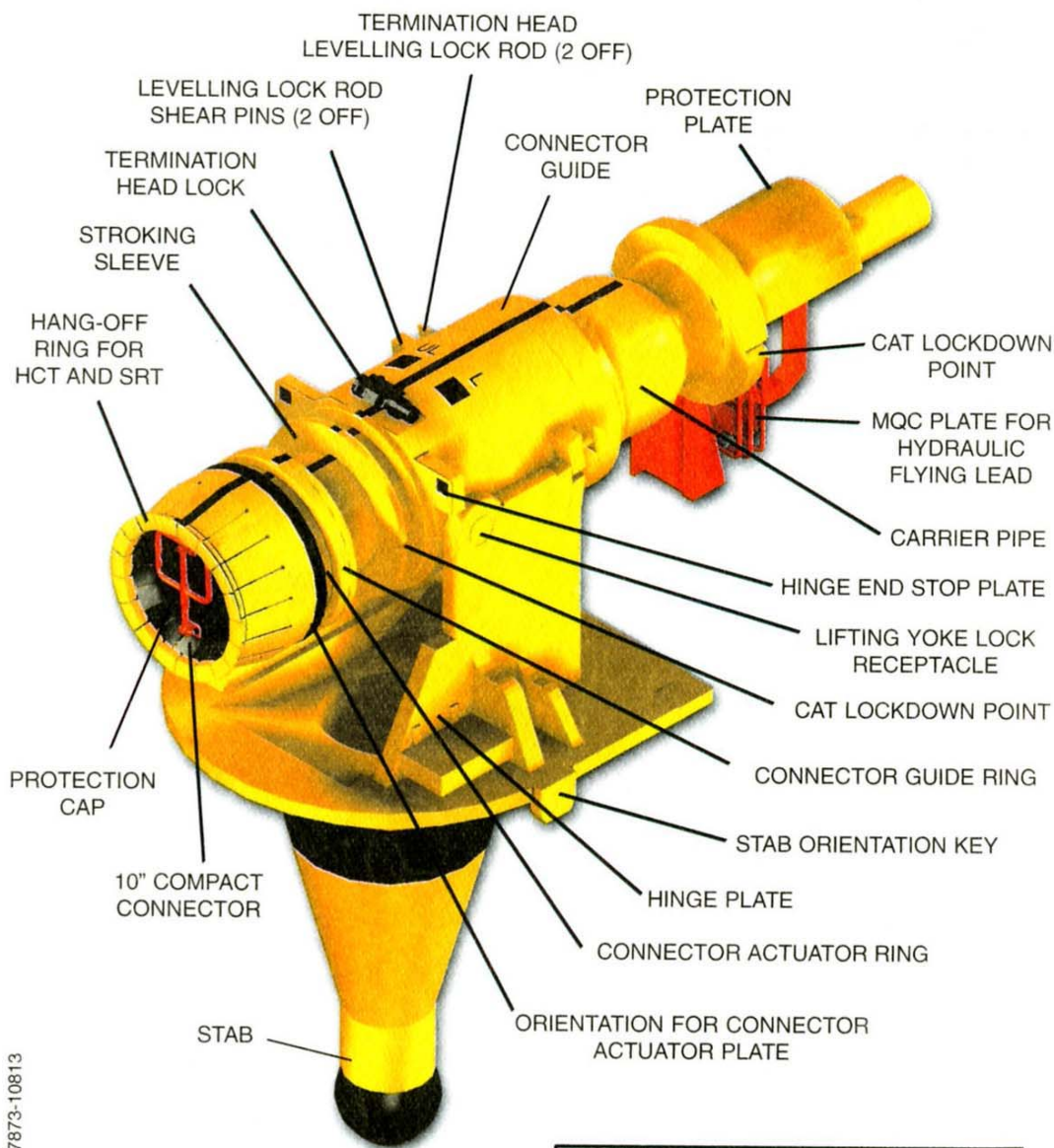
11591

Remote Control Unit

Umbilical, Flowline and Well Jumper System



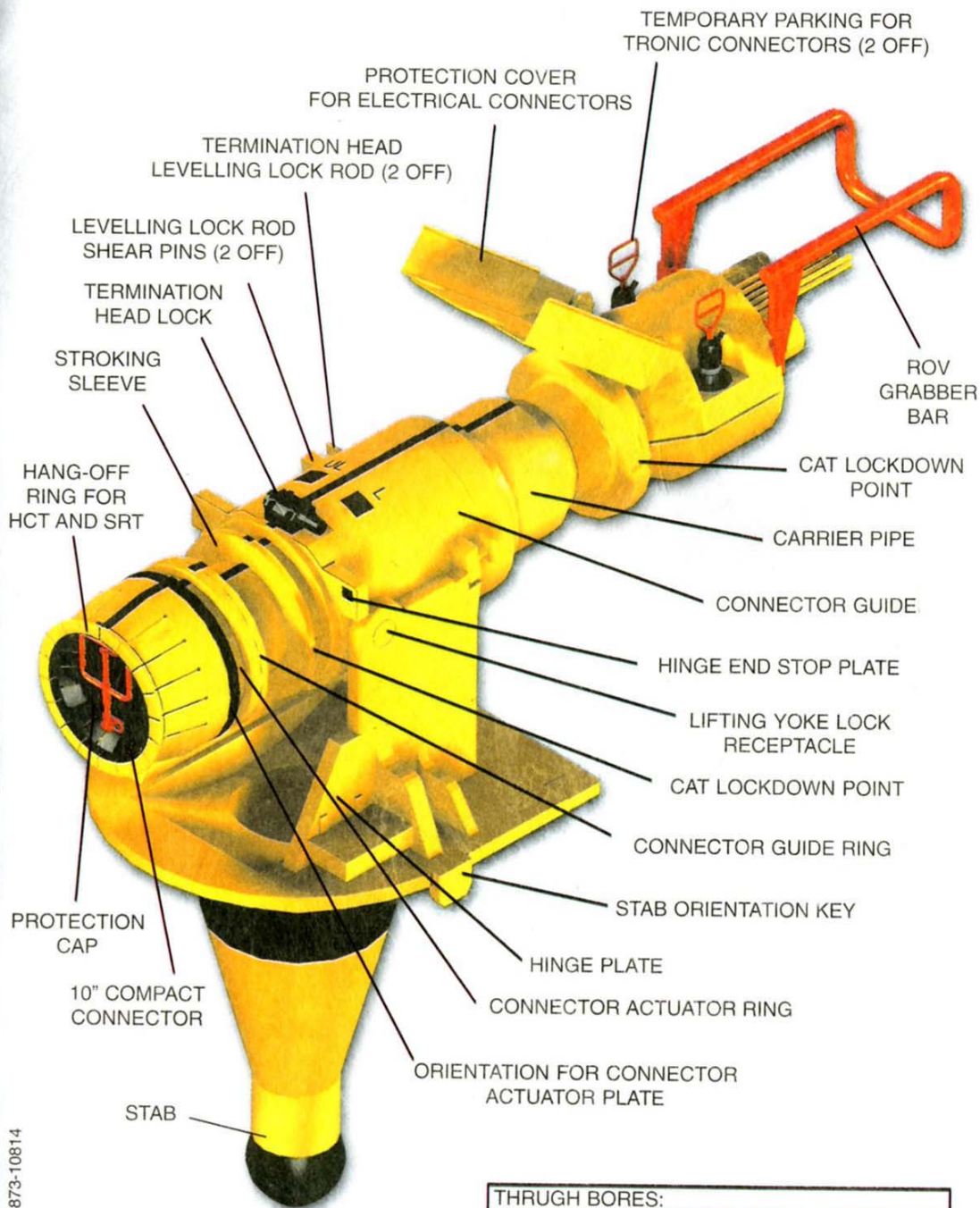
Production Well Jumper



THROUGH BORES:	
2 OFF LP	1/2" - 207 bar WP
2 OFF HP	3/8" - 690 bar WP
1 OFF SERVICE LINE	2" - 345bar WP
1 OFF INJECTION LINE	6" - 300 bar WP

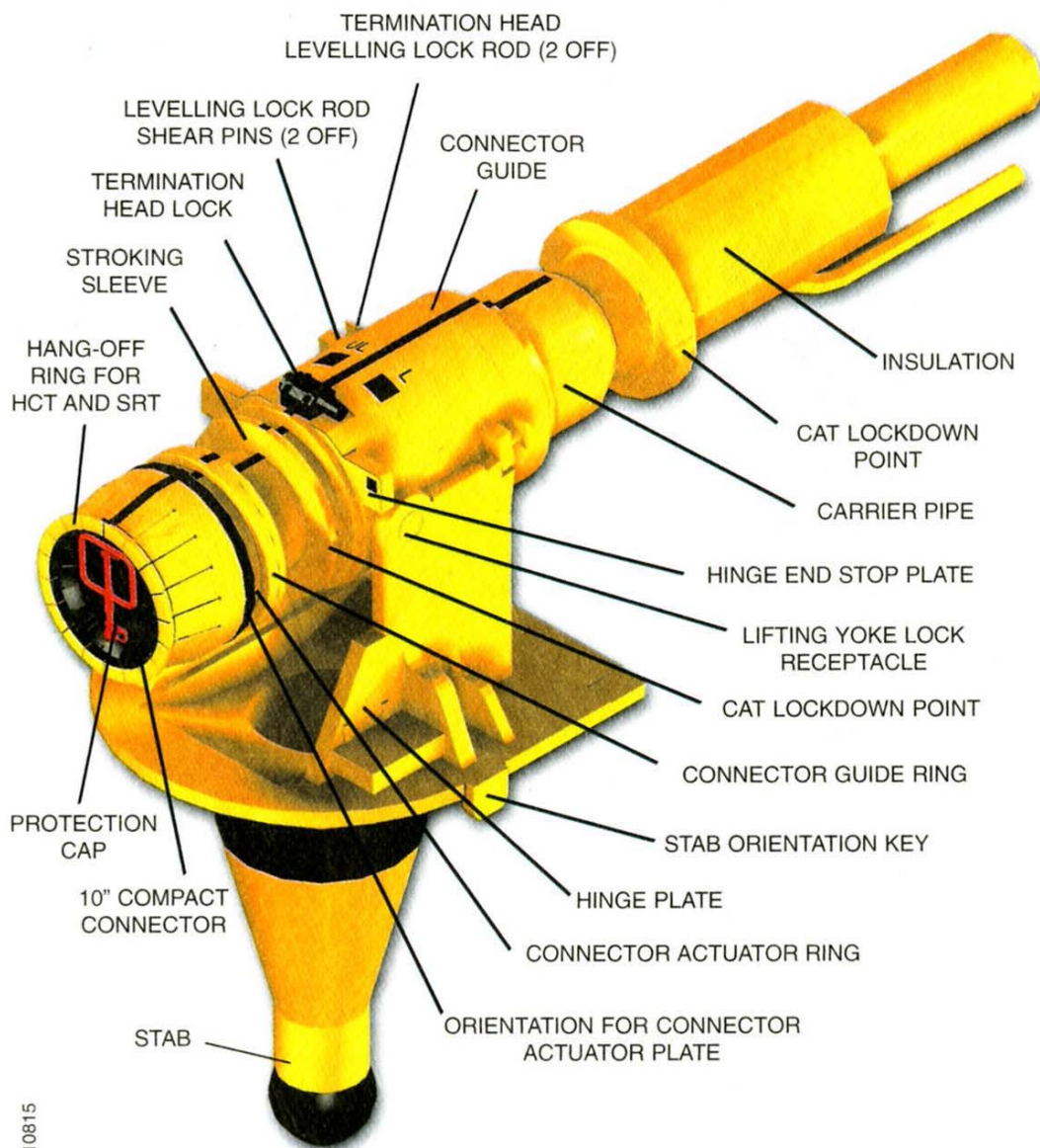
Termination Head Injection

7873-10813



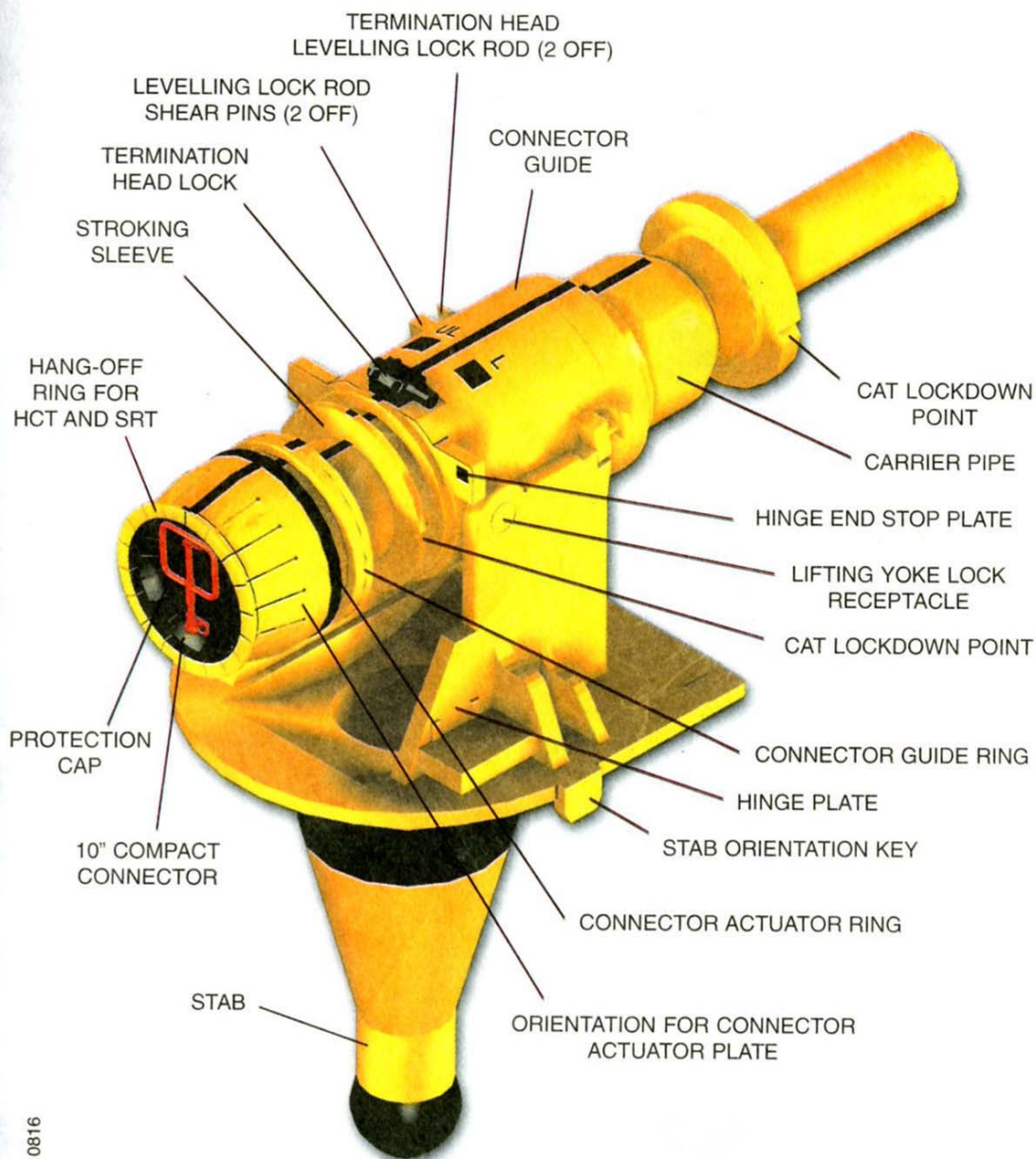
THROUGH BORES:	
4 OFF CI	1/2" - 345bar WP
2 OFF LP	1/2" - 207 bar WP
2 OFF HP	1/2" - 690 bar WP
1 OFF SERVICE LINE	2" - 345 bar WP
1 OFF PRODUCTION LINE	6" - 270 bar WP

Termination Head Production Well Jumper



THROUGH BORES:	
1 OFF PRODUCTION LINE	8" - 270 bar WP
4 OFF SERVICE LINE	1" - 345 bar WP

Termination Head Flowline 8" and 4"

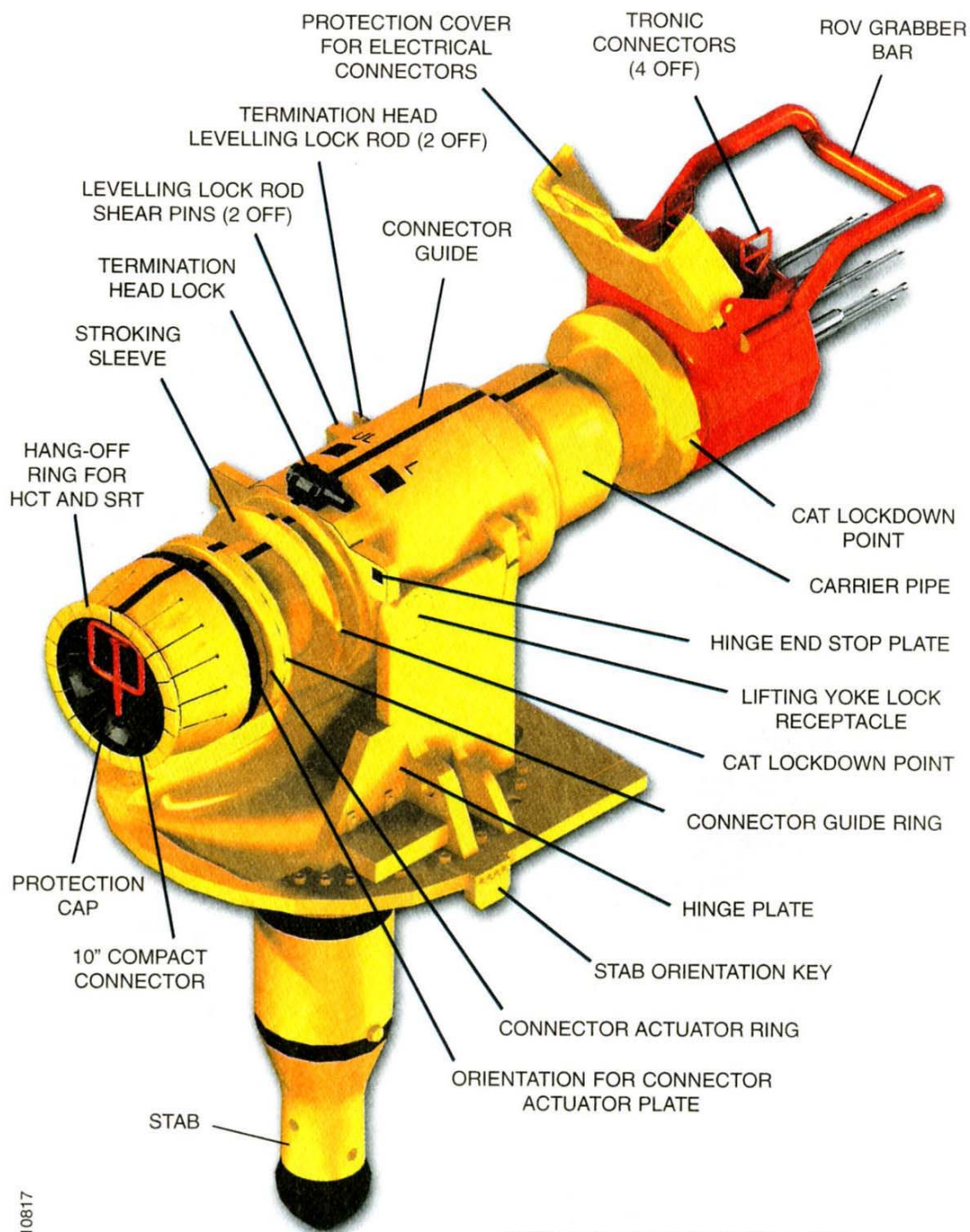


7873-10816

TROUGH BORES:

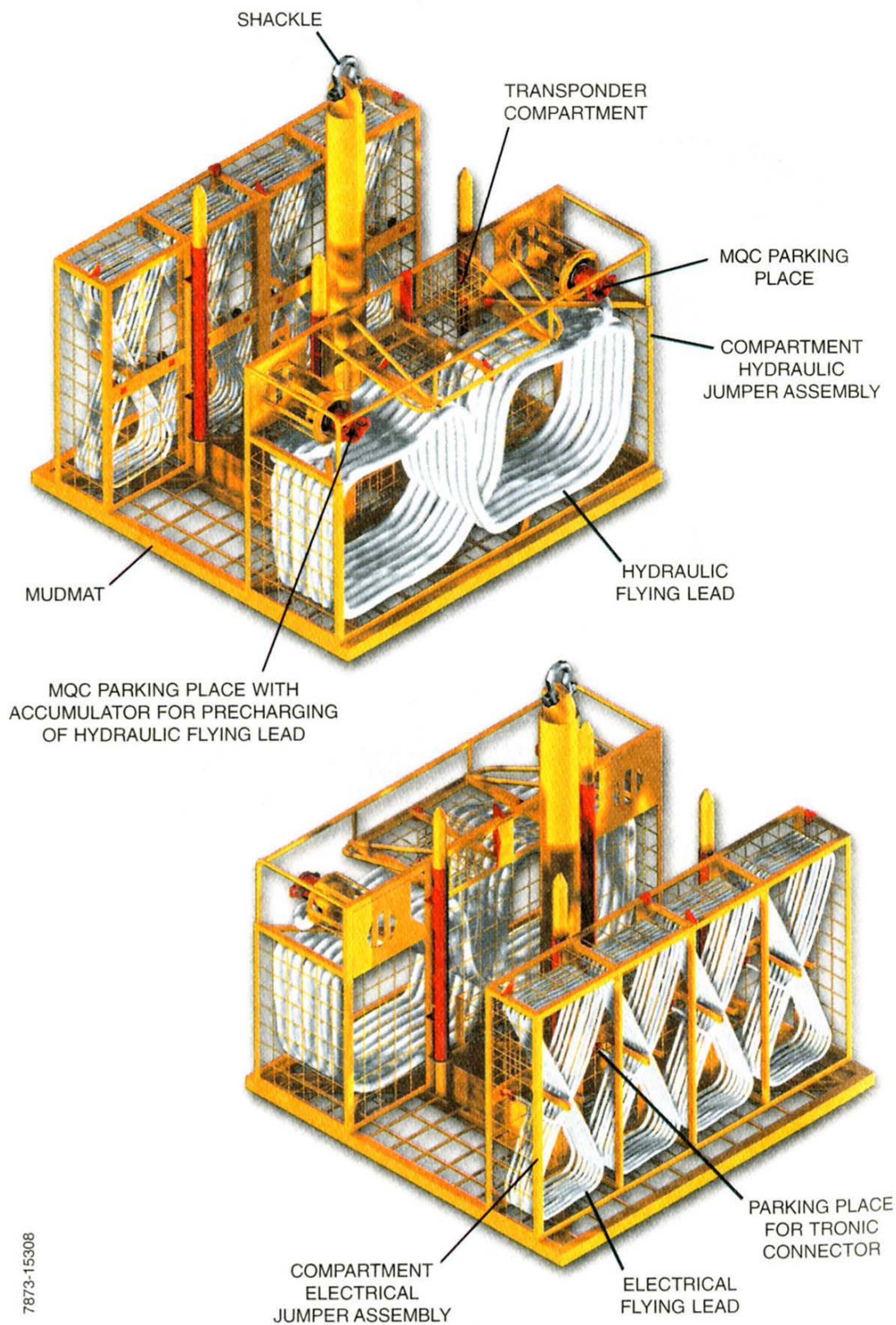
1 OFF PRODUCTION LINE	8" - 270 bar WP
-----------------------	-----------------

Termination Head Flowline 8"



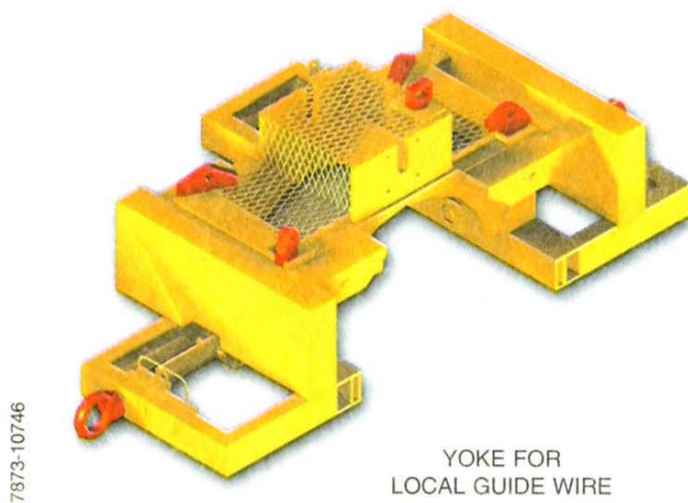
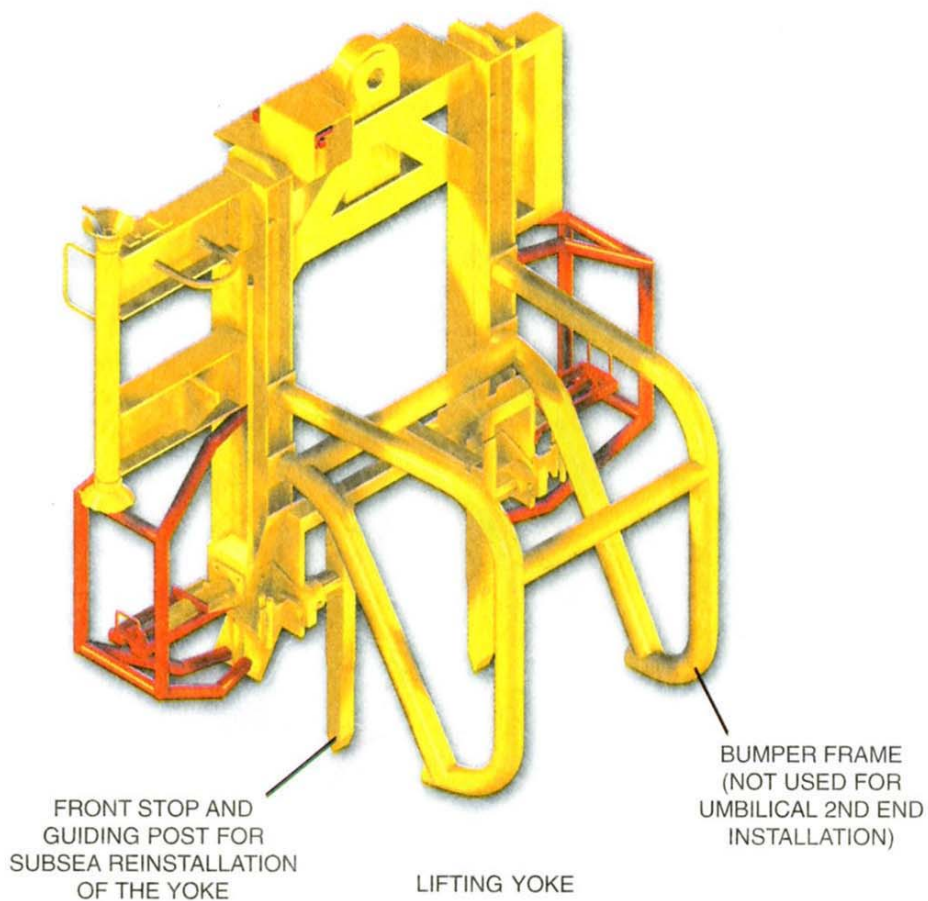
THROUGH BORES:	
2 OFF LP	1/2" - 207 bar WP
2 OFF HP	3/8" - 690 bar WP
6 OFF CI	1/2" - 345 bar WP

Termination Head Umbilical

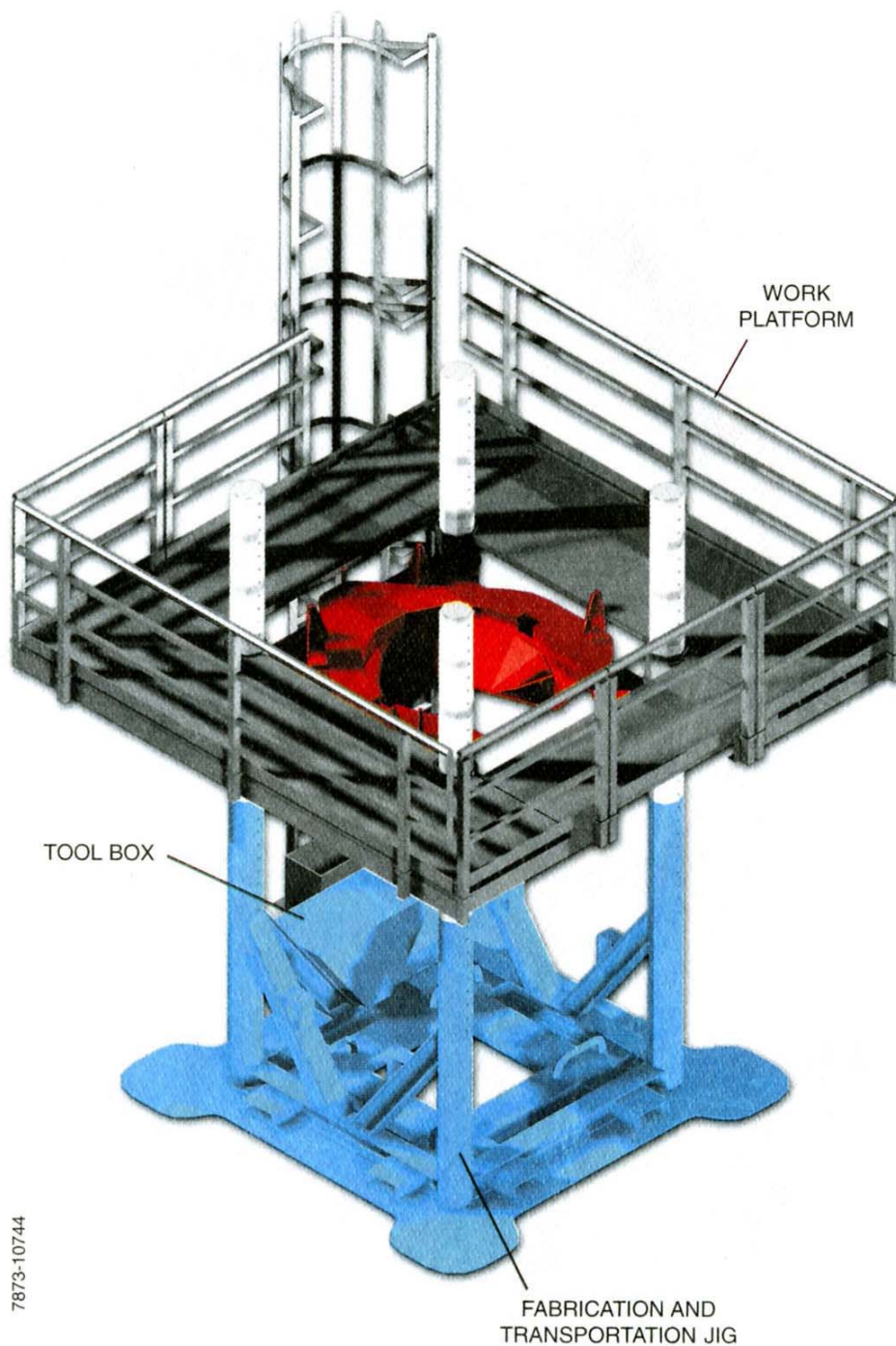


7873-15308

Basket for Flying Leads



Yokes



7873-10744

Fabrication Jig

Tables

COMPONENT DIMENSIONS AND WEIGHT. GIRASSOL

Description	Part no.	Width (mm)	Length (mm)	Height (mm)	Weight (kg)
Closed Caisson Foundation (CCF)	7402239	6900	6900	11515	25000
Manifold Support Structure (MSS)	100000980	8740	9225	2561	40531
Manifold SP1	7401922	5500	5772	3249	43000
Manifold SP1/F	7401923	5500	5773	3458	48800
Pig Loop Module (PLM)	7401925	4170	4972	2940	12511
Insulation Cap	100004692	842	1458	1003	342
Multiphase Flow Meter (MFM)	100000143	880	880	2125	1930
Insert Choke Running tool	100000372	724	724	1665	340
Module Running Tool (MRT) SCM mode	7604283	1149	1149	2158	1190
Module Running Tool (MRT) MFM mode	7604283	1149	1149	2850	1275
Connector Actuation Tool (CAT) including Flying Interface	7604282	1850	3476	1256	2500
Flying Interface	100009022	1500	605	750	270
ICM Test and Transportation Skid	100005731	1380	2520	1673	540
MRT Handling Frame, SCM mode	100000378	1510	1510	2320	770
MRT Handling Frame, MFM mode	100001368	1510	1510	2935	890
Production Well Jumper (Nominel)	NA	NA	35920	3300	22000

COMPONENT DIMENSIONS AND WEIGHT.
GIRASSOL

Description	Part no.	Width (mm)	Length (mm)	Height (mm)	Weight (kg)
Termination Head Injection	7500340	1350	2938	2641	4637
Termination Head Well Jumper	7500337/338	1350	3445	2739	4711
Termination Head Flowline 8"+4x1"	7500334	1350	3586	2641	4744
Termination Head Flowline, monobore	7500333	1350	3019	2641	4527
Termination Head Umbilical	7500331/332	1350	3067	2793	4244
Basket for Flying Leads	100017911	3000	3000	3317	2490
Lifting Yoke	100007192	1944	1143	1884	615
Yoke for Local Guide Wire	100007374	2051	730	647	685
Fabrication Jig without Working Platform	100014369	3100	3100	4525	4519
Stab 4L, 345 bar	100002110	140	390	140	4,5
HPC Removal Tool	100002180	375	137	537	25
Suction Kit	7601166	295	476	265	24
Torque Tool	7604290	300	600	360	38,5
Test Jig (Torque Tool)	7600544	215	320	215	10
HCT, Multibore	7604292	700	555	820	58
HCT, Monobore	7604291	700	580	820	56
Seal Replacement Tool	7604288	700	575	820	48
MQC Over. Jack MK2	7604322	425	490	166	33
ROV Tool Elevator	7603629	410	508,5	273	23
SCM Override Tool	7601172	249	547	249	15
HCT, 8" + 4 x 1"	100002081	700	555	820	55
RCU	7604289	300	455	417	71

VX Gasket Rep. Tool	7604734	517	517	500	25
HIC	100003353	130	510	150	6
ROV Override Jacks:					
- 3" Conn.	100006183	294	307	399	20
- XT Conn.	100010238	200	452,9	200	50
- LRP Conn.	100011092	273	262	514	25
- EDP Type 1	100009910	230	465	429	97
- EDP Type 2	100010206	230	465	429	97
Ext. seal test kit	100007836				6,6
Stab 2L, 345 bar, Mod.	7603696	165	343	165	7
Override Jack, PLM M.	100008621	200	568	860	49
Override Jack, Yoke M.	100008621	120	450	860	39
Override Jack, MFM	100001801	310	310	1160	70
Pressure Test Manifold	100009754	250	350	226	20
Over. Jack CAT Flying Interface	100012241				
- Lock Down Mode		300	400	802	30
- Docking Probe Mode		308	92	1052	25
Override Jack					
Term. Head	7604321	180	510	322	25
Override Jack					
TH Orient. pin	100007826	224,5	504	280	64,1
Hydraulic Jack, 10,6t	100011003	178	500,5	362	35
TH Orientation					
Check Tool	100007044	1098	1653	1258,31	75
Ejector	100015120	200	775	200	15
TH washout tool	100012333	425	1790	425	18,5

