TECHNICAL SPECIFICATION T10-12-00106

Twin Kamewa FF375S Waterjets for 14m FCS1605

Five ship sets of twin FF375S waterjets, including one station Vector Stick electronic-hydraulic control system.

Specification for a Kamewa Twin Water Jet

Contents: Twin FF375S for Alucat 1605
Project number: 10-12-00106

01 Main Technical Data

Preliminary data for the mechanical and hydrodynamic design

Type of unit	2xFF375S
Condition	MCR
Engine Type	Caterpillar C18
Engine power per unit, BkW	500kW@2100rpm
Pump power per unit, DkW	485kW
Gearbox type / ratio	Twin Disc HPTO 244 / 1:1
Pump speed, RPM ± 2%	2100rpm
Predicted ship speed, knots	subject to hull resistance
Net thrust per unit at above ship speed, kN	see attached thrust curve

Weights

Weight of waterjets, as dry, kg abt.	2 x 345
Entrained water in inlet duct(s), kg abt. - Inside transom	2 x 90

Direction of rotation

The direction of rotation for the impellers are **counter clockwise CCW seen from astern**

02 **Scope of Supply**

021 General

Material specification with symbols used below:

Casted aluminium (“cast”) SIS4245, AlSi7Mg
Welded aluminium parts (“welded”) SIS4140, AlMg4,5Mn
Stainless steel parts (“stainless steel”) SIS2324

022 2 Water Jet Units according to drawing 376 208 55, each consisting of:

1 Impeller, stainless steel

1 Impeller chamber, cast

1 Guide vane chamber, cast

1 Shaft, stainless steel

1 Shaft flange, steel

1 Inlet duct, welded

1 Oil lubricated thrust bearing

1 Water lubricated cutless type radial rubber bearing

1 Steering nozzle, cast

1 Reversing bucket, cast

1 Hydraulic cylinder for reversing, stainless steel

1 Hydraulic cylinder for steering, stainless steel

1 Set of zinc anodes

1 Set of special tools

023 Hydraulic System according to drawing 105 481 83

For each ship set:

2 Main hydraulic pump mounted on waterjet (Belt driven from jet flange, mounted outside on each jet looking from keel side)

2 Valve manifold including proportional control valves for control of reversing and steering. Installed on the waterjet

2 Set of pipes and hoses enabling connecting pressure and return lines to waterjet hydraulics.

1 Hydraulic power pack (45L) consisting of:
- 1 Tank with necessary valves and filters
- 1 level switch

Additionally:

2 Hydraulic oil coolers, built on waterjets

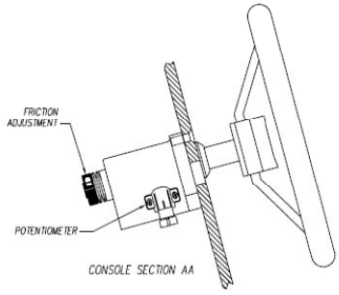
2 Steering cylinder (To be fastened inside boat transom)

024 <u>Electronic Remote Control System type Vector Stick, with One control station according to system diagram 080701-713 revision P7</u>

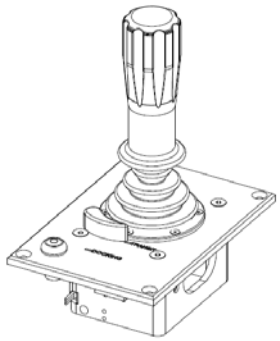
All control panels are supplied for so called desk mounting. They are as standard designed with a degree of protection IP 65 (splash water proof) and could be used for outdoor installation.

The control station includes:

1 Steering wheel for common control of the two steering nozzles

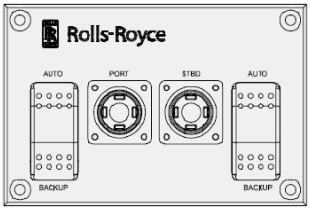


1 joystick single and dual axis, which combines the commands of all water jets and engines. Joystick movements correspond to vessel movements



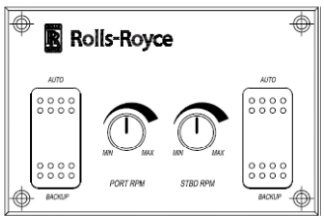
1 -Back-up control panel on main station for:

- steering
- reversing

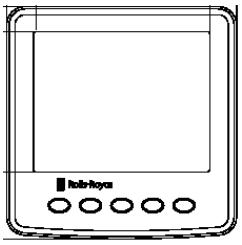


1-Back-up control panel on main station for:

- Engine RPM

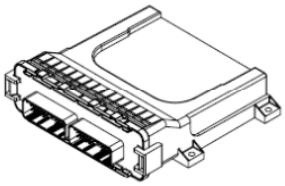


1 Display panel on main station for indication of steering nozzle, reversing bucket and interceptor position. The panel is also working as an alarm panel for the control system.



In the pilot house or in other suitable compartment:

1 Jet control unit for follow up control of reversing bucket position as well as steering nozzle and generation of RPM-setpoint (combinator).



Inside the transom:

1 Feed-back transmitter unit for each waterjet with mechanical transmission to the steering nozzle

1 Feed-back transmitter unit for each waterjet with mechanical transmission to the reversing bucket

Interconnecting cables:

1 set according to system diagram no 080701-713 revision P7

A set of interconnecting cables will be delivered with the electronic control system however cables included only between Rolls-Royce equipment according to the project specific system diagram attached.

Vector Stick Interfaces:

Main governor interface:

For each main engine:

Main system RPM control

From Vector Stick:

- One RPM command signal range 4-20 mA, 0-5VDC, Variable Frequency or PWM Signal to be galvanically isolated in the RPM governor system

Autopilot interface:

From autopilot to Rolls-Royce remote control system

- One 24VDC signal "Autopilot in service"
  Closed contact = In service
- One steering command signal, range ±10VDC, where:
  -10VDC correspond full port command
  0VDC correspond nozzle in the middle
  +10VDC correspond full stbd command

Alarm interface:

From Rolls-Royce remote control system to alarm system

- One “dry contact” output for alarm system (relays).
  Max operating current 500 mA.

Docking mode interlock:

From clutch/engine to Rolls-Royce remote control system

- Two potential free relay contacts

025 Documentation

1 CD with instruction manual and installation manual in English
1 Set of installation manual in English
2 Set of instruction manual in English

026 Classification

The equipment will be built to the classification requirements of DNV in accordance with the rules valid at the date of this tender.

Official certificates will NOT be delivered along with the equipment.

03 Items not included

Installation and startup assistance

Clutch interface

Hydraulic and lubrication oil

Hydraulic hoses/piping (Except set built on waterjets)

Calculations for torsional vibration, axial vibration and whirling are not included in our obligations, nor the shaft alignment calculations

Intermediate shaft between gearbox and waterjet

Bolts for connecting the shaft flange with the shaft coupling

Flexible shaft couplings

Standard tools