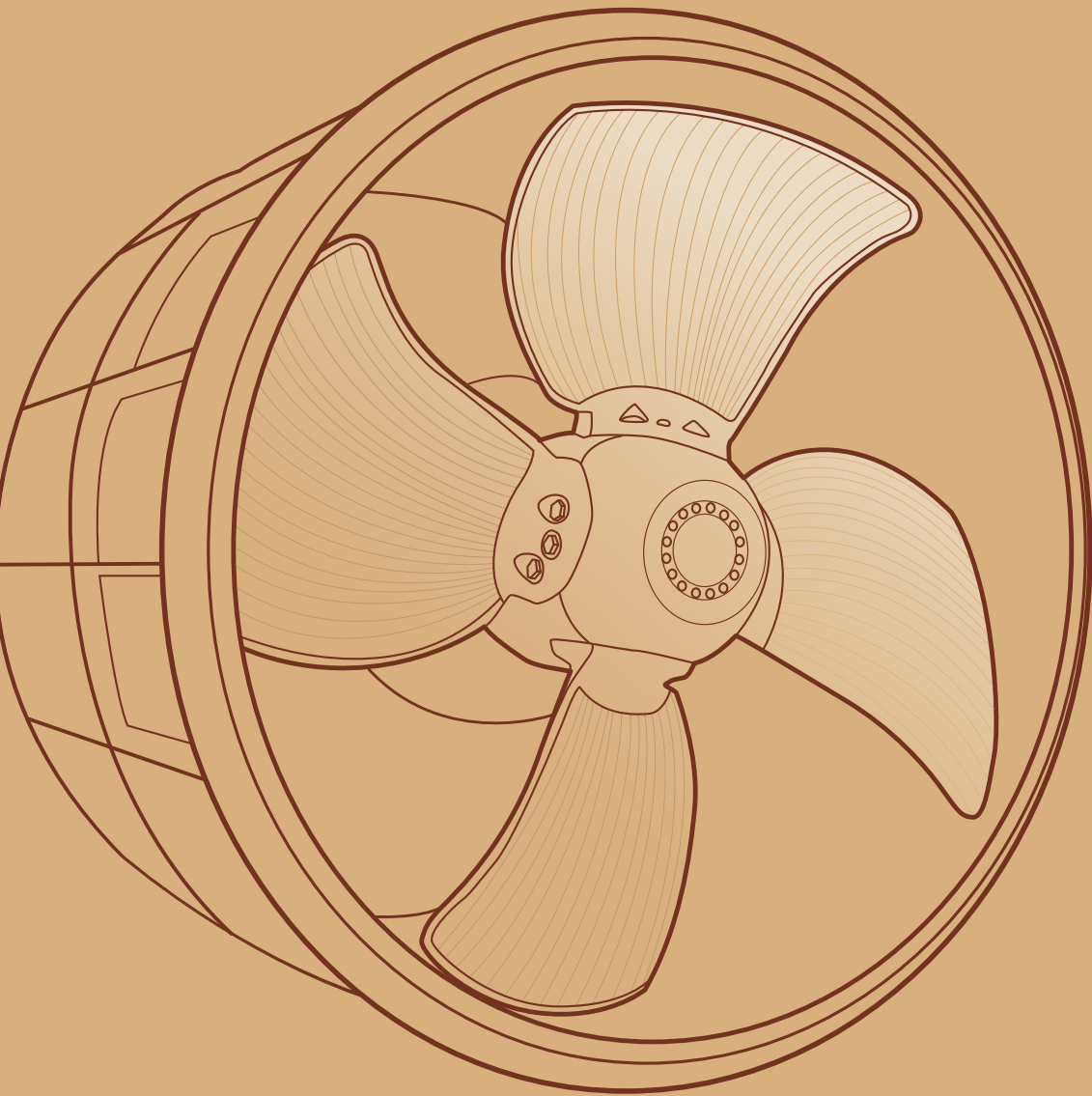


# SIDE THRUSTER



Take the sea with **KTE**

Take the sea with **KTE**



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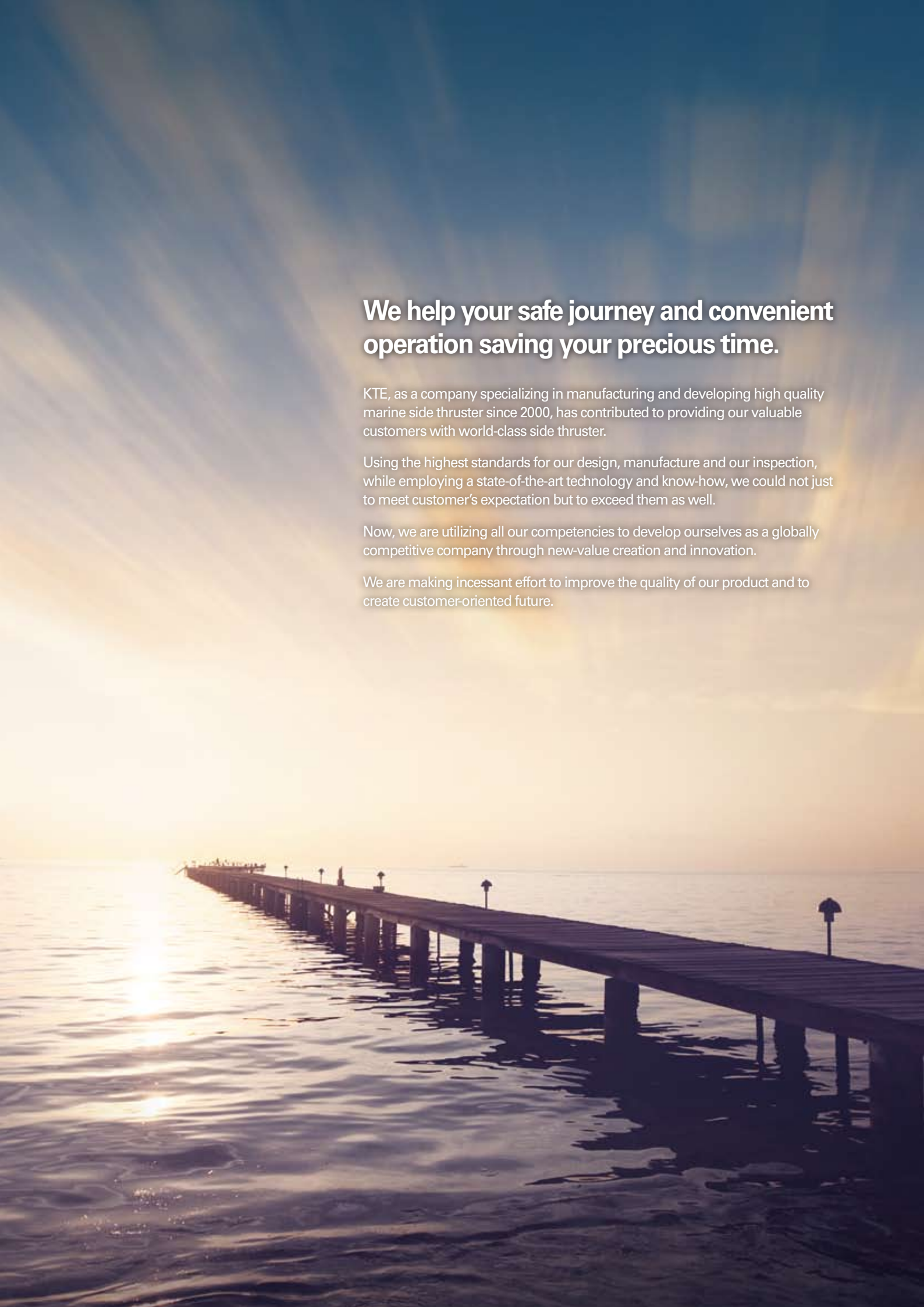
MODEL **TCT**

MODEL **TFT**

THRUSTER **CONTROL SYSTEM**

**SYSTEM STRUCTURE** and **AUXILIARY APPARATUS**

**SERVICE NETWORK**



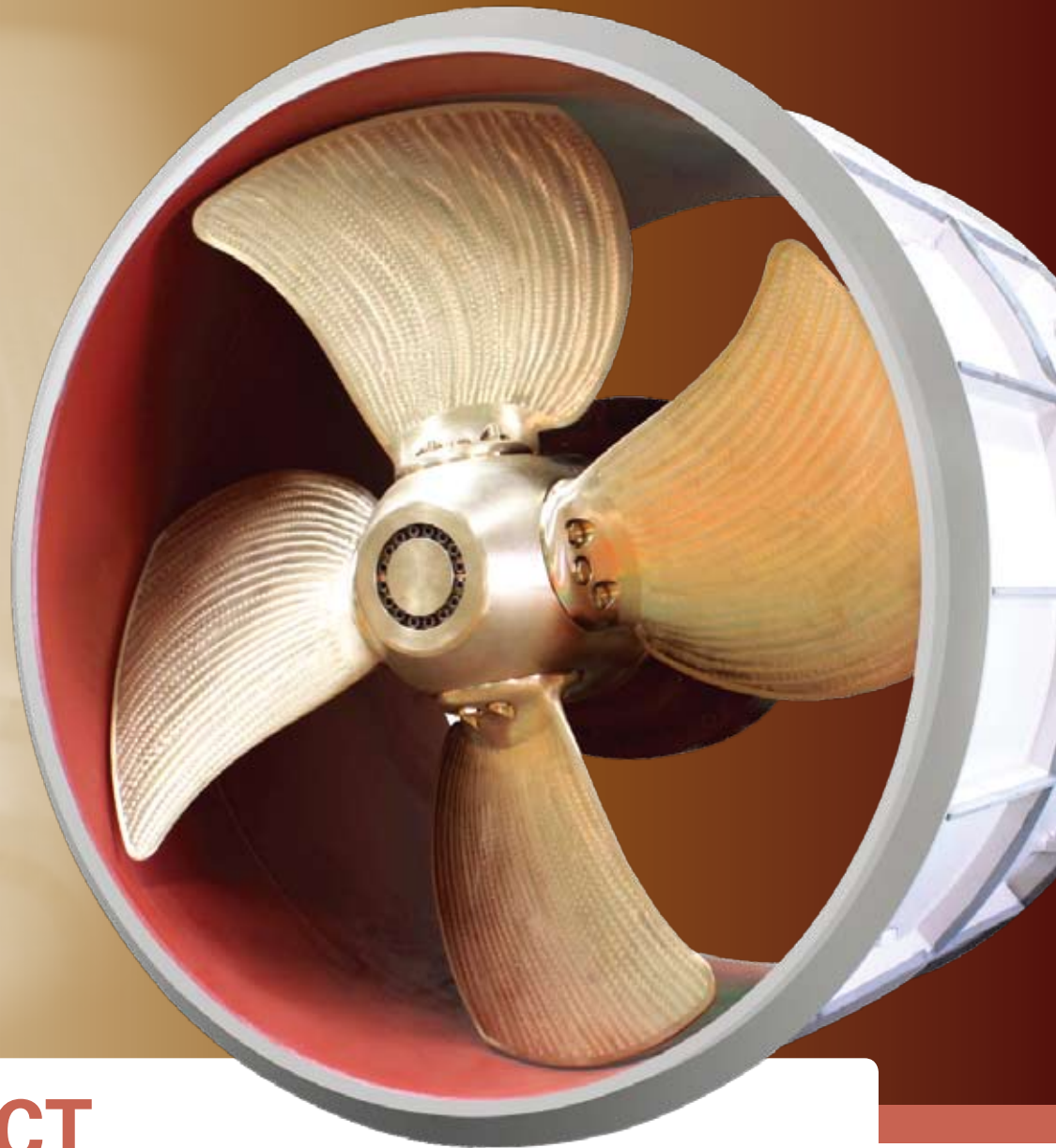
## **We help your safe journey and convenient operation saving your precious time.**

KTE, as a company specializing in manufacturing and developing high quality marine side thruster since 2000, has contributed to providing our valuable customers with world-class side thruster.

Using the highest standards for our design, manufacture and our inspection, while employing a state-of-the-art technology and know-how, we could not just to meet customer's expectation but to exceed them as well.

Now, we are utilizing all our competencies to develop ourselves as a globally competitive company through new-value creation and innovation.

We are making incessant effort to improve the quality of our product and to create customer-oriented future.



## Model TCT

Greater thrust while being more compact in size. Our model is completely newly designed thruster based on our vast experience and achievements.

### Features

#### Greater Thrust

As a result of tank tests, and improvements in both design and strength of the blades, we have created a thruster with much greater thrust than conventional ones of the past.

#### Minimum vibration, Low noise

Utilizing our unique forward-skew design for the thruster's blades and the results of many tank tests enabled outstanding progress in low noise and reduction in vibration.

#### Easy installation

Reduction in the thruster length has made it possible for the thruster to be installed to the forward part of the bow section of the ship compared to conventional ones. This gives the ship a great turning moment.

#### Easy maintenance and Inspection

Replacement of propeller blade can be conducted in the duct easily by removing the blade bolts. The thruster body can be dismantled in the duct, shifted outside and inspected on shore. Adoption of the same oil for lubrication and pitch control brings easy maintenance for the thruster.



“ Our model is completely newly designed thruster based on our vast experience and achievements. ”

## Scope of supply

- **Thruster body**  
Complete set of the propeller hub, Blades, gear housing, Drive shaft, Crown wheel, Propeller shaft, Cross head and duct
- **Shaft coupling (Universal joint etc.)**
- **Header tank**
- **Control system**
  - Hydraulic pump unit  
Pump, Solenoid valve and relief valve
  - Remote control  
Control sub-panel, Portable controller and blade angle feedback transmitter
- **Standard spare parts and tools**

## Option

The following equipments can be supplied at customer's option

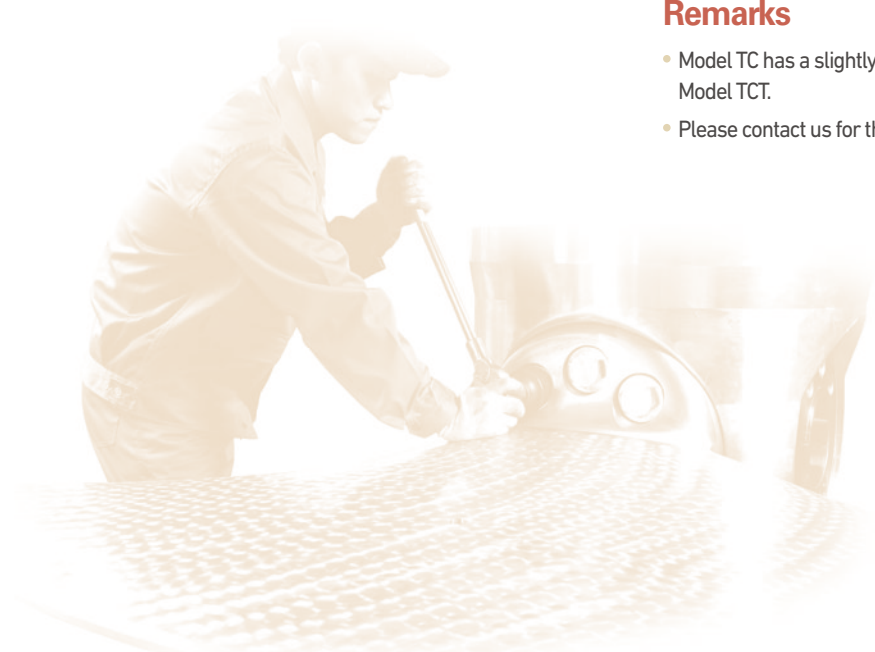
- **Zero pitch system**
- **Auto pitch Reduction system**
- **ALC(Automatic Load Control)**

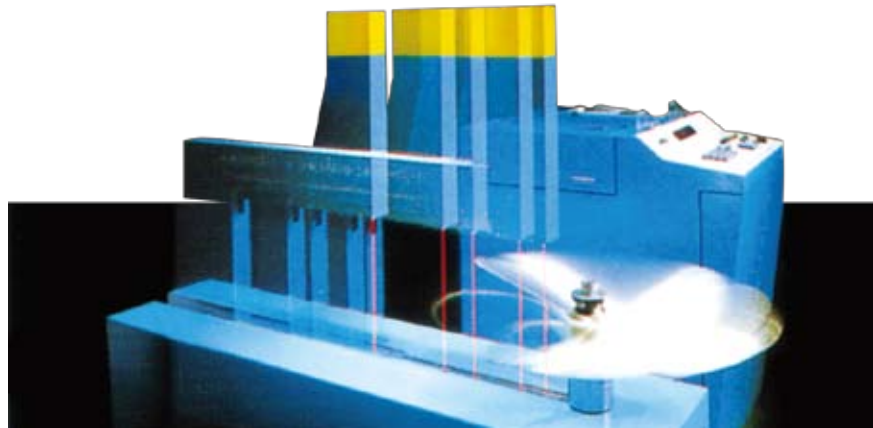
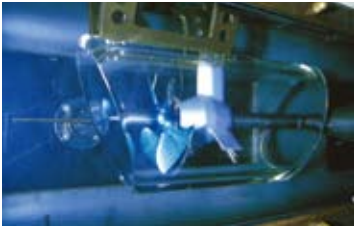
## Oils

- The oil for the thruster system must be clean enough and approved type, conforming to JIS K2219 / KSM 2129 or equivalent.
- The oil for the thruster system must be clean enough and approved type, conforming to ISO VG68 gear oil or the equivalent.
- Regarding the Environmental Acceptable Lubricant(EAL), please ask KTE before using it on your thruster. It should be applied the suitable seal ring for Environmental Acceptable Lubricant(EAL).

## Remarks

- Model TC has a slightly different inner structure and hydraulic system from Model TCT.
- Please contact us for the use at 50Hz or DPS





## Operating and Control

The side thruster model TCT consists of the thruster body, hydraulic pump unit for pitch change, remote controller, and prime mover.

Operating the follow-up dial, incorporated in the wheel house control panel, or the portable-controller dial actuates the solenoid valve inside the hydraulic pump unit. This then sends pressure oil from the hydraulic pump to the inside of cylinder (cross head) located in the thruster.

The oil moves the cross head directly, which in turn gets transmitted to the sliding shoe and crank ring, changing the angle of the propeller accordingly.

The pitch of the propeller is transmitted from the OT pipe to the followup transmitter via a chain, which is then displayed on the control panel indicator.

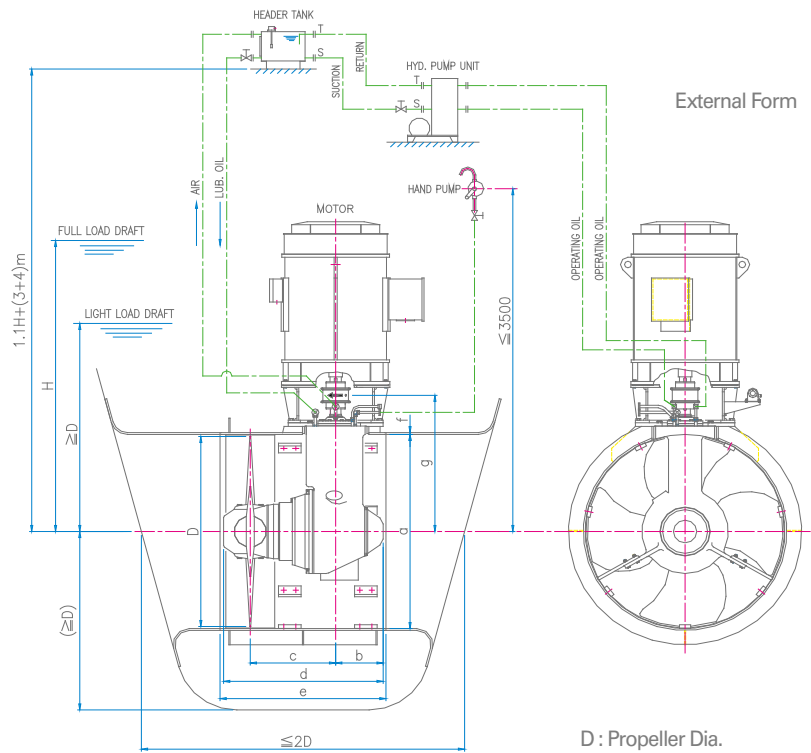
## Planning Specification

### Standard Type

Type	Motor Output (kw)	Motor Speed (60Hz) (rpm)	Lub.Oil in Thruster (L)	Header Tank Capacity (L)	Weight		
					Thruster (kg)	Hdy.Pump Unit (kg)	Header Tank (kg)
TC-70N	115	1760	25	15	700	190	40
TC-85N	175	1760	40	30	810	190	60
TCT-105	335	1760	70	35	1400	120	55
TCT-120	425	1760	110	35	1950	120	55
TCT-135	550	1760	140	35	2500	120	55
TCT-150	690	1760	170	35	3050	120	55
TCT-165	825	1180	220	50	4000	140	60
TCT-185	1010	1180	260	50	4900	140	60
TCT-200	1220	1180	340	85	6600	150	70
TCT-220	1500	1180	440	85	8100	150	70
TCT-240	1725	880	560	85	10000	150	70
TCT-260	2070	880	690	110	12300	190	80
TCT-280	2410	880	850	110	16000	190	80
TCT-315	3050	715	1100	150	22000	250	100

### Advanced Type

Type	Motor Output (kw)	Motor Speed (60Hz) (rpm)	Lub.Oil in Thruster (L)	Header Tank Capacity (L)	Weight		
					Thruster (kg)	Hdy.Pump Unit (kg)	Header Tank (kg)
TCT-220A	1800	1180	440	85	8250	190	70
TCT-240A	2150	1180	560	85	10150	190	70
TCT-260A	2500	880	690	110	12500	250	80
TCT-280A	3000	880	850	150	16300	250	100
TCT-315A	3650	880	1100	150	22300	250	100



## Dimensions

### Standard Type

Type	Main Dimensions(mm)							
	D	a	b	c	d	e	f	g
TC-70N	700	735	370	405	920	950	10	565
TC-85N	850	890	404	501	1065	1100	12	645
TCT-105	1050	1086	404	500	1050	1110	14	820
TCT-120	1200	1236	390	656	1210	1270	14	920
TCT-135	1350	1386	443	707	1340	1400	16	1030
TCT-150	1500	1538	442	748	1400	1460	16	1130
TCT-165	1650	1692	467.5	808	1500	1560	19	1245
TCT-185	1850	1894	489	863	1607	1660	19	1350
TCT-200	2000	2046	539	934	1750	1800	22	1460
TCT-220	2200	2250	538	992	1834	1890	22	1600
TCT-240	2400	2452	595	1077.5	2000	2050	25	1736
TCT-260	2600	2656	631	1134.5	2120	2170	25	1860
TCT-280	2800	2858	705	1266	2350	2400	27	2010
TCT-315	3150	3214	750	1374	2550	2630	30	2240

### Advanced Type

Type	Main Dimensions(mm)							
	D	a	b	c	d	e	f	g
TCT-220A	2285	2336	538	992	1834	1890	22	1645
TCT-240A	2490	2542	595	1077.5	2000	2050	25	1780
TCT-260A	2700	2756	631	1134.5	2120	2170	28	1910
TCT-280A	2955	3016	705	1266	2350	2400	27	2090
TCT-315A	3270	3336	750	1374	2550	2630	30	2300



## Model TFT

Our model is completely newly designed thruster based on our vast experience and achievements.

### Features

**Prime mover** is available by means of reversible hydraulic motor, reversible electric motor or diesel engine.

Direction of thrust can be obtained by controlling direction of revolution and any thrust in the range by controlling prime mover speed.

**Simple** structure and easy maintenance.

**Lubrication** at turning and rubbing positions inside thruster unit is of oil soaking system therefore oil supply inspection is not necessary. Header tank is arranged in piping connection with thruster unit and keeps a little higher lubrication oil pressure inside thruster than sea water pressure, thereby an ingress of seawater is prevented.

**The thruster** unit is fabricated inside the duct and both ends of the duct are welded to the hull.





## Scope of supply

- **Thruster body**  
Complete set of propeller gear housing, Drive shaft, Crown wheel, Propeller shaft and duct
- **Shaft coupling**
- **Header tank**
- **Standard spares and tools**

## Exclusion

- Nozzle tube and bell mouth to connect with duct
- Guard grid and zinc anodes for protection from corrosion
- Pipes and piping work
- Electric wires and wiring work
- Installation base seating for each equipment, liner and fitting bolts
- Lubrication oil, other oils etc.

## Option

The driver mover and control equipments for thruster operations can be supplied at customer's option.

- **Hydraulic motor driving**  
Comprising ; Hyd. motor, Hyd. pump, Suction filter, Relief valve, Check valve, Magnetic directional control valve, Pressure gauge, Rubber hose etc.
- **Electric motor / Driving**  
Comprising;  
Cage type motor, Starter, Wheelhouse panel etc.
- **Engine Driving**  
Comprising;  
Engine body with reversing reduction gear, Wheelhouse panel, Gauge board, Clutch and governor control box etc.



# THRUSTER CONTROL SYSTEM



## W/H Operation Unit **KTE-TOU**

- Input specification  
Digital input : 2 Channel
- Output specification  
Digital output : 5 Channel
- Em'cy stop switch
- Position selection switch
- Control mode switch
- Control switch
- Blade angle & command indicator



## W/H Display Unit **KTE-TDU**

- Input specification  
Digital input : 3 Channel
- Output specification  
Digital output : 5 Channel
- Screen control switch : F1~F8 Switch  
Indication screen : LED Status indicator & 7" color LCD Display



## Functions

### Auto Blade Angle Control

Main function of this system is to control blade angle with command value. That is to say, this system controls blade angle automatically with command, when follow up control algorithm is used. If feedback value becomes close to command value, this system doesn't transmit S/V control signal constantly but pulse signal with constant time interval and feedback value can reach the objective value quickly without overflowing command value. Users have to set parameters with parameter setting equipment in advance and it is possible to set parameters properly in accordance with characteristics of every ship.

### Auto Load Control

This is for protecting overload in follow up operation and controlled automatically by PI control depending on set points.

If main motor actual load is more than present load in follow up condition, the blade angle automatically changes to the angle of preset load.

### Zero Pitch System

During voyage of the vessel, sometimes the propeller is rotated by the tide (the seawater coming into the thruster tunnel) and the pitch is moved out of the zero position. In this situation, the hydraulic pump automatically will be started and the pitch is kept in zero. When blade angle returns to zero position, hydraulic pump and solenoid valve will be stopped after preset time.



### Main Control Unit KTE-TMU

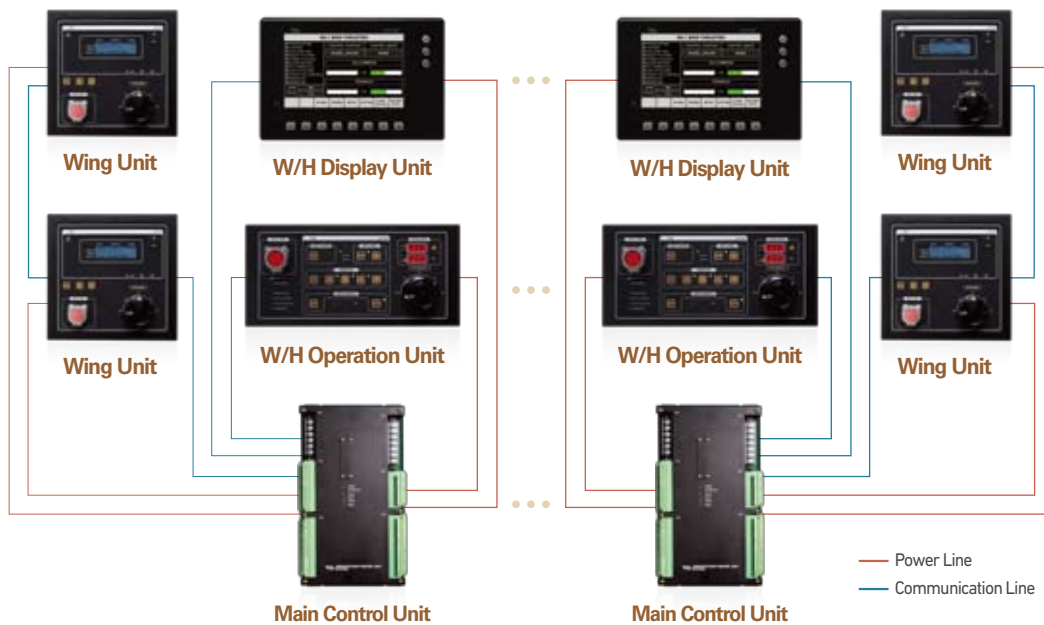
- Input specification  
Analog input : 3 Channel  
Digital input : 30 Channel
- Output specification  
Analog input : 2 Channel  
Digital output : 20 Channel



### Wing Unit KTE-TWU

- Output specification  
Digital output : 5 Channel
- Em'cy stop switch
- Control switch
- Indication screen : LED & VFD status indicator

# SYSTEM STRUCTURE and AUXILIARY APPARATUS



## Features of controller

- Simple design and compact size.
- Easy system expansion and maintenance.
- Easy interface to DPS(1,2),AMS,VDR etc.
- Flexible addition or modification of function.
- Combination control.

## Standard Specification

- Supply voltage : DC 24V
- Temperature : 0 ~70
- Controller : 16 bit Micro-controller
- Communication method : 2 CAN Channel

## Main Motor Starter

- Low Voltage Starter  
Power Source : AC440V ~ AC690V / Enclosure : IP23 ~ IP44  
Starting Method : Auto-Transformer or Soft Starter
- High Voltage Starter  
Power Source : AC3300V ~ AC6600V / Enclosure : IP23 ~ IP44  
Starting Method : Auto-Transformer Starting



Thruster Starter Panel



Header Tanker

## Hyd. Unit Starter

- Component : Start/Stop Push Button / Alarm Lamp / Indication Lamp / Ammeter / Run Hour Meter

## Header Tank

- Component : Tank Filter / Magnet Filter / Level Switch / Oil Level Gauge / Air Breathe



## Hand Pump

This pump is used for removing oil and oil test of the inside of gear housing

Hand Pump



## Hyd. Pump Unit

- Component : Gear Pump / Electric Motor / Pressure Switch / Pressure Gauge / Suction Filter



Hyd. Pump Unit

## Hyd. Pump Unit (Dual Type)

LNGC, Cruise Vessel, Special Vessel etc

- Component : Gear Pump(with Stand by motor) / Electric Motor(with Stand by motor) / Pressure Switch / Pressure Gauge / Suction Filter



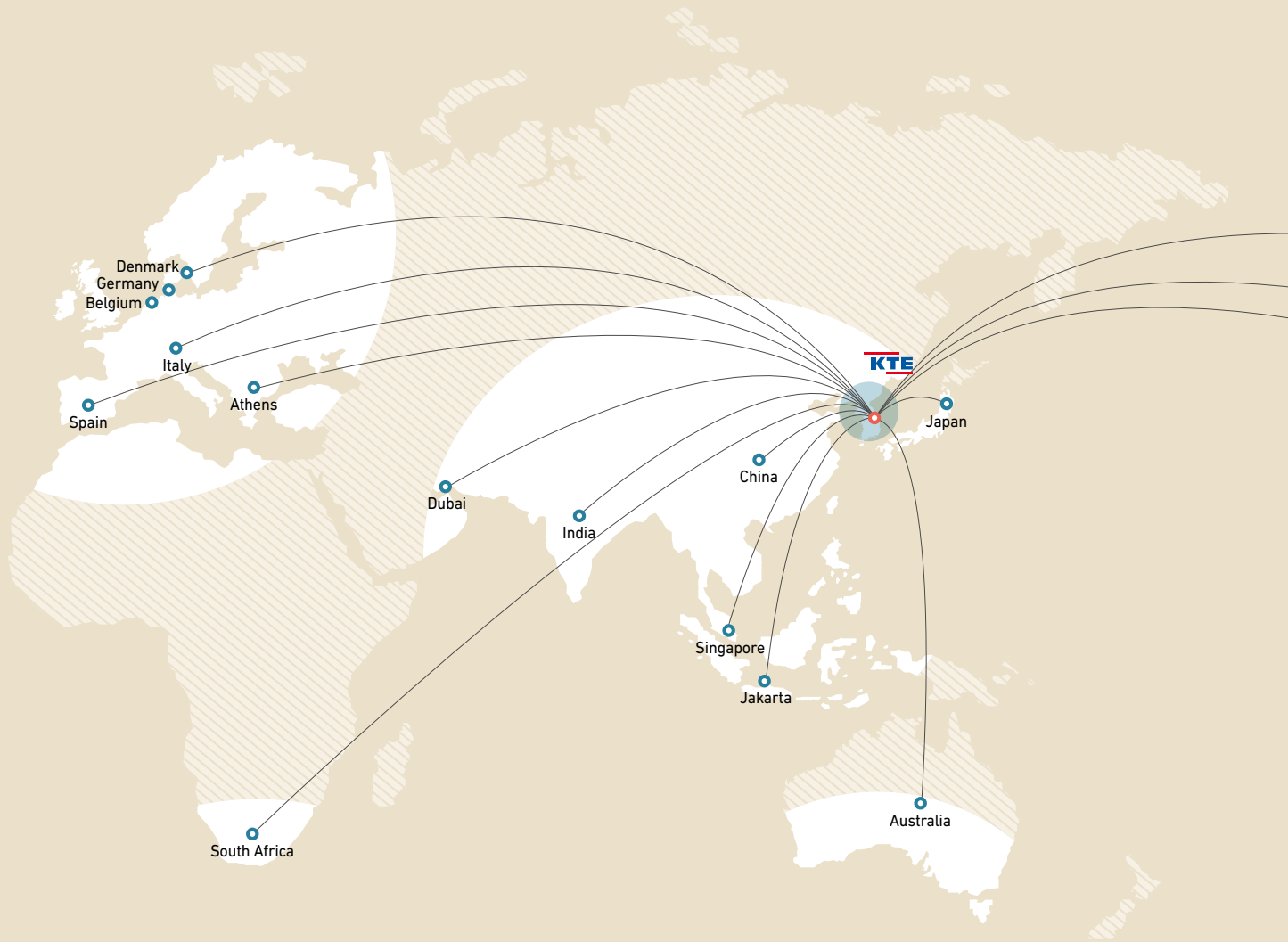
Feedback Box

## Feedback Box (Follow up Transmitter)

- The feedback box is mounted on the motor stand.
- The mechanical movement is transmitted by means of a chain link and sprocket gear to the potentiometer.
- Potentiometer is electrically connected to the thruster control panel of the bridge.

# Service Network

Customers are recommended to contact KTE first.



● Electrical service available ● Mechanical service available ● Electrical & Mechanical service available

## Athens

● **Franman Limited**  
 TEL : +30-210-9532 350  
 FAX : +30-210-9532 355  
<http://www.franman.gr>

## Australia

● **Read's Electric Company Pty. Ltd.**  
 TEL : +61-8-9335-9344  
 FAX : +61-8-9335-9465  
[www.Readselectric.com](http://www.Readselectric.com)  
 ● **H.I. Fraser Pty. Ltd.**  
 TEL : +61-2-9970-7322  
 FAX : +61-2-9913-7207  
[www.hifraser.com](http://www.hifraser.com)

## Belgium

● **Maintenance Partners NV**  
 TEL : +32-3-544-3235 (24/7)  
 FAX : +32-3-542-3035  
[www.maintenancepartners.com](http://www.maintenancepartners.com)

## Brazil

● **Metalock Brasil**  
 TEL : +55-13-3226-4686  
 FAX : +55-13-3226-4680  
[www.matalock.com.br](http://www.matalock.com.br)

## China

● **Saiernico Electric & Automation Ltd.**  
 TEL : +86-511-8888-3508  
 FAX : +86-511-8888-2561  
[www.saiernico.com](http://www.saiernico.com)  
 ● **Shanghai NSE Co.,Ltd.**  
 TEL : +86-21-5858-4430 / 4431  
 FAX : +86-21-5858-4332  
[www.nse.net.cn](http://www.nse.net.cn)  
 ● **Shanghai Marine diesel engine research institute**  
 TEL : +86-21-3131-0307  
 FAX : +86-21-5171-1737  
[www.csic-711.com](http://www.csic-711.com)  
 ● **Taiyo Electric Co.,Ltd. Shanghai Liaison Office**  
 TEL : +86-21-62415961  
 FAX : +86-21-62346939  
<http://www.taiyo-electric.co.jp>  
 ● **Zhejiang Xin Ya Electric Development Co.,Ltd.**  
 TEL : +86-58-0309-1119  
 FAX : +86-58-0309-1157  
[www.xy-cd.com](http://www.xy-cd.com)

## Denmark

● **Metalock Denmark A/S**  
 TEL : +45-4373-6620  
 FAX : +45-4373-6625  
[www.metalock.dk](http://www.metalock.dk)

## Dubai

● **Maritronics**  
 TEL : +971-4-3247500  
 FAX : +971-4-3242500  
<http://www.maritronics.com>

## Germany

● **Karle & Fuhrmann**  
 TEL : +49-471-97919-0 (24/7)  
 FAX : +49-471-97919-50  
[www.karle-fuhrmann.de](http://www.karle-fuhrmann.de)

## India

● **Favourite Marine Service**  
 TEL : +91-222-372-0780 / 372-4164 / 377-0319  
 FAX : +91-222-374-1992 / 460-7046  
[www.favouritemarine.com](http://www.favouritemarine.com)

## Italy

● **A Santamaria Spa**  
 TEL : +39-335-6515928  
[www.a-santamaria.it](http://www.a-santamaria.it)



\* I.S.E.S(International Electrical & Engineering Services Association) network available.

\* Schneider's CIS(Customer International Support) network also available everywhere in the world for HV Switchboard, Okken & all the Schneider's products.

**Japan** ● **Bemac Uzushio Electric Co.,Ltd.**

TEL : +81-898-25-8630  
FAX : +81-898-25-8631  
www.bemac-uzushio.com

● **Nakashima Propeller Co.,Ltd.**

TEL : +81-86-279-5111  
FAX : +81-86-279-3595  
http://www.nakashima.co.jp

● **Taiyo Electric Co.,Ltd.**

TEL : +03-3293-3061  
FAX : +03-3292-7002  
http://www.taiyo-electric.co.jp

**Jakarta** ● **Taiyo Electric Co.,Ltd.**

**Jakarta Liaison Office**  
TEL : +62-21-629-7074  
FAX : +62-21-629-7045  
http://www.taiyo-electric.co.jp

**Korea** ■ **KTE Co.,Ltd.**

TEL : +82-51-600-3516  
FAX : +82-51-265-0250  
www.kte.co.kr

**Panama** ● **Talleres Industriales SA**

TEL : +507-433-9500 & 445-1044  
FAX : +507-445-1104  
www.talleresindustriales.com

**Singapore** ● **Cyclect Electrical Engineering PTE Ltd.**

TEL : +65-6863-6877 / 9003-6992 / 9003-9039 (24/7)  
FAX : +65-6863-6260  
www.cyclect.com.sg

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www.lhm.co.za

● **L.H. Marthinusen Engineering Services**

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FAX : +27-31-205-7339  
www.lhm.co.za

**Spain** ● **Alconza Berango S.L.**

www.alconza.com

● **Crosscomar S.L.**

TEL : +34-956-675-200  
FAX : +34-956-675-118  
www.crosscomar.com

**United States** ● **Seaboard Control Inc.**

TEL : +1-281-328-8620  
FAX : +1-281-328-7832  
www.seaboardcontrols.com

● **Koffler Electrical Mechanical Apparatus Repair**

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FAX : +1-510-567-0636  
www.koffler.com



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