KUMOH MACH. & ELEC. CO., LTD.

www.komeco.net / e-mail: kos@komeco.net
We heartily welcome you for visiting KOMECO!

**KOMECO** is a company that designs and manufactures monitoring device controllers and control panels necessary in medium and large sized diesel engines and power generation facilities for land and marine use and supplies the manufactured products to domestic and international shipbuilding yards and engine manufacturers.

Our company has formed a partnership with a domestic generator company on the remote controlling and monitoring system (EGCP) for large land power plants and medium or small emergency power plants, conducting installation and trial operation throughout the world. The remote control and monitoring system (ECMS) for propelling of drill ships and power plants on ships has implemented the latest smart technology, which has allowed us to supply multi-functional, high quality and low cost equipment to large domestic shipbuilding yards.

In addition, we have completed localized development of shipbuilding materials such as vibration compensator, shaft power meter, bearing monitoring system and bridge monitoring system to reinforce cost competitiveness and are supplying these materials to large domestic shipbuilding yards. Our company actively participated in the national new and renewable energy development project to fulfill the government’s energy reduction and eco-friendly policies. Solar and wind power inverters have been localized, and we are cooperating with large enterprises to conduct fuel cell business.

Also, our company is making continued investments on research and development to acquire technologies such as noise filter on ships, basic technology to overcome EMI (EMC, EMS) and interpretation of diesel engine characteristics, which are the core fields of study within the industry.

Our company is putting greatest efforts to guarantee customer satisfaction and stable quality of products in the global market, supply the products trusted by customers, contribute to improved overseas competitiveness and development of the national security industry and domestic heavy industry, and be become a healthy corporation making contributions to the society.

Please send us constant advices and encouragements.

Thank you very much.

Chief Executive Officer Kang, Byeong Chun
KUM OH MACH. & ELEC. CO., LTD

- ESTABLISHED: FEB. 1995
- ADDRESS: 1554, Bansong-ro, Gijang-eup, Gijang-gun, Busan, Korea
- PHONE: +82-51-724-5070
- FAX: +82-51-724-5175
- LAND AREA: 10,000 m²
- FLOOR SPACE: 8,000 m²

BUSINESS SCALE

- AVERAGE ORDERS / YEAR: USD 35 MILLION
- AVERAGE SALES / YEAR: USD 30 MILLION
- EMPLOYEE: 126
- CREDIT GRADE: BBB
The history of company

Feb. 1995  Established a corporation, KOMECO Co., Ltd.
Aug. 1996  Joined the membership of Korea Marine Equipment Association
Feb. 2001  Acquired the Approval of its R&D Center (Korea Industrial Technology Association)
Aug. 2001  Selection of a Promising Small and Middle Business
Jun. 2006  Designated a promising small and medium exporter (Busan and Ulsan Export Center, Small and Medium Business administration)
Jun. 2006  Designated as a Venture business (Busan and Ulsan Regional Office, Small and Medium Business Administration)
Jun. 2006  Designated as a Inno-Biz business (Busan and Ulsan Regional Office, Small and Medium Business Administration)
Jul. 2008  Receive a grand prize for minor enterprisers.(Present Metropolitan City)
Sep. 2013  Designate as strong hidden champion in Busan by MOEL
Dec. 2014  Awarded by president commendation for creation management and job creation
Mar. 2015  Awarded as a best taxpayer by Busan city government

The present state of registered as a major Company

May 1994  Registered as a partner of SsangYong Heavy industries.
May 1994  Registered as a partner of Hankook Heavy industries.
May 1994  Registered as a partner of Hyundai Heavy industries.
Jul. 1994  Registered as a partner of Daewoo Shipbuilding & Maritime Heavy industries.
Aug. 1994  Registered as a partner of Hanjin Heavy industries.
Mar. 1995  Registered as a partner of Samsung Heavy industries.
Apr. 2005  Registered as a partner of Korea Midland Power.
Apr. 2009  Registered as a partner of Korea Southern Power.
May 2009  Registered as a partner of POSCO. (Present POSCO ICT.)
Mar. 2015  Registered as electric work license
Organization

Chief Director
B. C. Kang

Total: 126 persons

- Technical Institute
  - Precedence Team
  - R&D Team
  - Technical Support Team
- Sales
  - Marine Engine Team
  - Plant Team
- QM
  - Planing Team
- Designing
  - Marine Engine Team
  - Plan Team
  - 1st, 2nd, 3rd Team
- Management
  - Finance Team
  - General Affairs Team
- Purchasing Materials
  - Purchasing Team
  - Materials Team
- Seoul Office
  - Planing Team
  - 1st, 2nd, 3rd, 4th Team
- Production Team
  - Ins Team
  - Cs Team
- Facility Team
  - Planning Team

Kumoh Mach & Elec. Co., LTD.
ISO 9001:2008
- Certificate No.: 47008
- Organ.: ABS
- Date: 26th Dec. 2014

Export Great Promise Company
- Certificate No.: 12-15
- Organ.: Busan Ulsan Export Center, SMBA
- Date: 1th June. 2012

Venture Business
- Certificate No.: 20080105696
- Organ.: KIBO
- Date: 22th Aug. 2008

R & D Center
- Certificate No.: 20011186
- Organ.: Korea Industrial Technology Association
- Date: 2nd Feb. 2001

INNO - BIZ
- Certificate No.: 6021-0780
- Organ.: Small and Medium Business Administration
- Date: 23th June. 2006

SIGLE PPM QUALITY
- Items: AXIAL VIBRATION MONITOR
- Certificate No.: 1-02-2-1298
- Organ.: Small and Medium Business Administration
- Date: 29th Dec. 2006
ENGINE CONTROL EQUIPMENTS

ENGINE CONTROL SYSTEM
- LOCAL CONTROL PANEL
- M/E CONTROL SYSTEM
- G/E AUTO. CONTROL SYSTEM

ENGINE CONTROLLER
- ESP-2000 SERIES
- START MODULE SERIES
- DTM-ISU-10

SPEED PICK-UP SENSOR
- SPEED SENSOR FOR ENG.
- SPEED SENSOR FOR T/C

VIBRATION MEASURING SYSTEM
- AXIAL VIBRATION MONITOR
- INDUCTIVE SENSOR

TEMP. SENSOR & MONITOR
- RESISTANCE BULB
- THERMOCOUPLE
- TEMPRATURE MONITOR

ELECTRONIC EQUIPMENTS
- GROUP ANNUNCIATOR
- TACHOMETER FOR ENG. & T/C
- CONVERTER (V/I, F/I, F/V) etc.
MARINE EQUIPMENTS

- MAIN SWITCH BOARD
- POWER DIST. & START PANEL
- TRANSFORMER
- WATERTIGHT DOOR IND. PANEL
- SHAFT HORSEPOWER METER
- VIBRATION COMPENSATOR

MARINE EQUIPMENTS

- MONITORING & CONTROL SYSTEM (HMI)
  - SWITCH GEAR
  - MCC
  - PLC CONTROL PANEL
  - INVERTER PANEL
  - LOCAL CONTROL PANEL

Kumoh Mach & Elec. Co., LTD.
Automatic Control System

- Automatic Control System (ACS) is designed to apply on the generator engine of ship such as HYUNDAI-MAN B&W engine L16/24, L21/32, L27/38, L32/40 and Himsen engine H21/32.

- ACS is electronic automatic control system with the high performance and compact size.

  - Multi-channel analog data such as temperature and pressure, which are generated from lubricator oil, cylinder, turbocharger exhaust gas, fuel oil, etc., are able to be processed on real-time.

  - Also, the engine control is automatically optimized from the engine status.

  - ACS has the monitoring function of engine status for stability and the independent safety function for redundancy.

  - ACS has the monitor and display functions for various status and alarms from diesel engine, such as temperature, pressure, and rpm.
KOMECO has manufactured GEN. ENGINE SAFETY & CONTROL & MONITORING SYSTEM and supplied them to major engine maker (HHI-EMD, STX ENGINE) over years.

ENG. SAFETY CONTROL SYSTEM. Provides continuous measurements & display of ENGINE RPM, exhaust gas temp, tempreature & pressure for F.O & Lub oil etc, base on PLC. and operating conditions for GEN. ENGINE provides to AMS (ALARM MONITORING SYS.)

→ Types : GEN. ENG SAFETY CONTROL SYSTEM FOR Drill Ship

→ Engine Applicable : MAN B&W (HHI-EMD, STX ENGINE)
  - HHI-HIMSEN
    H32/40, H32/40V
    L32/40, V32/40
  - V32/40, L32/40

→ Main Components : PLC / GROUP ANNUNCIATOR.
  - Micro Processor Control ENGINE CONTROL CABINET.
  - CONTROL STATION & T.B BOX.
### Tacho System

This is a system that detects and controls the speed of land and marine engines, turbocharger and propeller by using Pick-up Sensor and indicates rpms of the machines by using Tachometer. The system can be developed and supplied in accordance with customer specifications.

#### Engine Tacho System

- This system consists of Sensor for engine speed detection, Control Unit and Analogue Tachometer(or Digital Tachometer).

- The system controls the rpm system by using signal from Pick-up Sensor attached onto the engine or revolution machine and indicates rpms by using Analogue or Digital Tachometer.

- The system can be developed and supplied in accordance with customer specifications.

- Pick-Up Sensor : Mg. Pick-UP Sensor(PG-04S, PG-07), Speed Pick-up Sensor(SPS-02A-01/02/03/04), Tacho Generator(IPTT-60-01)

- Control Unit : Speed Measuring & Loop Fail Monitor(ESP-2000), Speed Measuring Unit(ESP-2000A/B/BS), Engine Start Module(SM-01/2/3, DTM-ISU-10), Speed Watch(ESW-1000N-A), Governor Control Unit, Speed Relay(SR-01A-A, SR-200E-A), RPM Comparator(RIC-200PN-A), Over Speed Switch(ESW-300)

- Tachometer : Digital Tachometer(DTM-160V/C/F) Analog Tachometer(TM-160)

#### Turbocharger Tacho System

- This system consists of Sensor for Turbocharger speed detection, Control Unit and Analogue Tachometer(or Digital Tachometer).

- The system converts Frequency Signal from Speed Sensor attached onto Turbocharger into Voltage or Current Signal and indicates rpms by using Analogue or Digital Tachometer. The system can be developed and supplied in accordance with customer specifications.


- Control Unit : Speed Watch(ESW-40000N-A/60000N-A)

- Tachometer : Digital Tachometer(TDT-50F), Analog Tachometer

- Option : Junction Box, Dimmer Volume, Toggle Switch, I/I Converter
# Tacho System

<table>
<thead>
<tr>
<th>Propeller Tacho System</th>
</tr>
</thead>
<tbody>
<tr>
<td>• This system consists of Sensor for Propeller speed detection, Teeth Band, Frequency/Voltage Converter for Control Unit and Analogue Tachometer(or Digital Tachometer).</td>
</tr>
<tr>
<td>• The system controls the rpm system by using signal from Pick-up Sensor attached onto the Propeller and indicates rpms by using Analogue or Digital Tachometer. The system can be developed and supplied in accordance with customer specifications.</td>
</tr>
<tr>
<td>- Teeth Band</td>
</tr>
<tr>
<td>- Sensor with Box</td>
</tr>
<tr>
<td>- F/V Converter</td>
</tr>
<tr>
<td>- Propeller Tachometer</td>
</tr>
</tbody>
</table>
Product

Temperature Monitoring System

This system is used to measure temperatures of the inside of Cylinder for Main or Aux. Generator Engine, Boiler and industrial equipment by using Thermocouple & Resistance Bulb and makes a digital display of the measurements by using Monitoring Unit. The system can be developed and supplied in accordance with customer specifications.

<table>
<thead>
<tr>
<th>Temp. Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thermocouple</strong>: This thermocouple has the positive pole made of Ni-Cr (Chromel) which contains 10% Cr and the negative pole, Ni alloy (Alumen) which contains Al and N. It is most widely used for industrial purposes.</td>
</tr>
<tr>
<td><strong>Resistance Bulb</strong>: This is a 3-line resistance bulb (pt100ohm) whose inside is full of alumina powder ensuring high resistance to vibration and shock and high responsiveness to temperature change.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitoring Unit</th>
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</thead>
<tbody>
<tr>
<td>Auto Scanner (TCS-3200)</td>
</tr>
<tr>
<td><strong>Temperature Monitor</strong> (DMC-10T, TMU-12CA)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option</th>
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<tbody>
<tr>
<td><strong>Multi Current Converter</strong>: Based on temperature data from RS-485 Telecommunication, this unit converts temperature for each of 12 Channels into a current signal (4~20mA dc) and then outputs it.</td>
</tr>
</tbody>
</table>
Consisting of Inductive Sensor and Monitoring Unit, this system is used to measure vibration at Crank Shaft for Main Diesel Engine. The system can be developed and supplied in accordance with customer specifications.

**Sensor**
- Inductive Sensor
  (BAW-030-PF-1-K-10, BAW-018-PF-1-K-05)

**Monitor**
- Axial Vibration Monitor:
  This unit measures and displays Peak-to-Peak vibrations ranging from 0.00 to 10.00mm by sending Current Signal(4-20mA), which is in direct proportion to distance between Crank Shaft and Inductive Sensor.
Electronic Equipment

- Prog. Group Annunciator (PGA-06, PGA-08H)
- Cable Supervision (CS-04N, CS-08T)
- Alarm Monitoring (AM-06N, AM-12N)
- Indication & Switch Unit (ISU-05, ISU-08)
- Pump Mark Transmitter (PMT-22/33/40)
- Pump Mark Indicator (PMI-70/100/120)

Level Switch

This is a magnetic float switch that detects the level of Engine fuel (F.O) or Lubrication Oil (L.O) or the oil or water level of Lubrication Oil Tank (L.O SUMP TANK) to make a warning sound or control water supply or discharge by Pump.
- Approval Cert.: GL

- Level Switch
  (LS-01/02/03/04/05/06/07/08/09/10/11/12)
# Product

## Electric System

### Remote Control & Monitoring System

- KOMECO has developed and manufactured Remote Control and Monitoring Systems for marine and land applications and supplied them to major customers including large shipbuilders over years.
  - **Types**: Control and Monitoring Panels for Ship and Land Engines, Control Panel for Engine Room, Operation and Monitoring Panels for Accessories and etc.
  - **Applications**: Coastal Passenger Ships, Tour Ferries, Naval Battleships, Coastal Patrol Boats and etc.

### Engine Control Panel

- KOMECO has manufactured Engine Control Panels for marine and land applications and supplied them to major engine makers (HHI-EMD, STX Engine, Doosan Engine, Hyein and etc.) over years. Based on these experiences, the company now has design and production systems that can rapidly satisfy requirements for engine control panels by customers such as shipbuilding companies and ship classification agencies.
  - **Types**: Engine Control Panel for Marine or Land Power Generator, Engine Control Panel for Ship Propulsion, Engine Control Panel for Pump and etc.
  - **Engines Applicable**:
    - MAN B&W (HHI, STX 엔진):
    - HHI-HIMSEN: H21/32, H25/33
    - Caterpillar, Cummins, MTU, Dihatsu Engine
  - **Main Components**:
    - Group Annunciator
    - Control Logic: PLC, Relay Logic & Micro Processor Control
    - Speed Measuring Unit
    - Cable Supervision Unit
    - Alarm Monitoring Unit
Electric System

Main Switch Board & Starter

- Manufactured in compact style, this control panel is designed to control, operate in parallel and monitor marine and land power generators and supply power to various types of electric equipment. It has components that increase power supply reliability and protect loads, fulfilling customer and ship-class requirements.

  → Types : Main Switch Board, Em'cy Switch Board, Synchro Control Panel, Feeder Panel, Group Starter, Aux. Blower Starter, Turning Gear Starter, Cylinder Lubrication Starter, Motor Starter El. Box & Indicating Panel

  → Main Components : - Power Management System  
  - Alarm And Interface System  
  - Auto Synchronizing  
  - Auto Load Sharing  
  - Auto Change Over Function  
  - Synchroscope With Lamp  
  - Phase Seq Monitor For Shore Power  
  - Insulation Monitor  
  - Electrical Protection Device  
  - Magnet & Relay  
  - Breaker etc.

Others

- TRANSFORMER’S (Technical Affiliations with IEC TRANS.)
- POWER DISTRIBUTION BOARD, GROUP STARTER
- Operation and Monitoring Panels for Different Engines
- Various Types of Alarm Panels
- Water Tight Door Indicating Panel
- Battery Charger, UPS, AVR
- Press. Gauge Board (For Lng Vessel)
- Reefer Container, Socket (For Container Vessel)
- Miscom & Air Lock System
**Electric System**

### Starter

- **Types**: - Wye-delta(\(y-\triangle\)) Starter
  - Reactor Starter
  - Direct On Line Starter
  - Soft Starter

- **Applications**:
  - Aux. Blower Motor, Turing Gear Motor
  - Sea Water Pump, F.O/L.O Pump, Fan Motor
  - Compress & Unit Cooler
  - Condensing Unit, Child Water
  - Unit Heater, Supply Fan

- **For Navy**: Military Standard
  (Shock & Vibration : MIL-S-901D, MIL-S-167)

### Uninterruptible Power Supply

- The Uninterruptible Power Supply is designed to keep output voltage at a certain level even in case of input voltage variation by using Reactor and Power FET(Field-Effect Transistor).

- **Characteristic**:
  - Built-in protective circuit for preventing Battery from being overcharged or over-discharged (extended Battery life).
  - Over/Low voltage protection circuit is built in (converted into power failure compensation).
  - Built-in Overload protection circuit.

- **Applications**:
  - Turbine Control System (AC & DC Power)
  - Bridge Manoeuvring System (AC & DC Power)
Solar Photovoltaic Lamp Control Unit

• This system controls the operations of Solar Cell, Battery and Lamp and protects these components. It has the function of user interface, making it possible for users to set and check the system operation.

• This system consists of Charger which keeps the energy of Solar Cell in the battery, Converter and Inverter which convert DC voltage of the battery into AC voltage for Lamp driving, Sensor which detects voltages and currents of the cell and battery and Display which indicates the state of the system operation.

→ Types :
  - Photovoltaic Lamp Control Unit (AC Type)
    • SPVL - 36W
    • SPVL - 55W
    • SPVL - 66W
  
  - PV Controller (DC Type)
    • SPVL-12D
Alarm Monitoring System

A. M. S

• Alarm Monitoring System, model KAMS2014 is the distributed alarm monitoring system based on the microprocessor in order to monitor status of engine, pump, door, etc. during navigation.

• As KAMS2014 supports from 10 to 100 alarm points, this can be applied to small/medium/huge vessel.

Characteristics

- Distributed alarm monitoring system

- Flexible system architecture with easy system expansion

- Redundant communication network with 1Mbps(max.) CAN field-bus

- Easy installation and operation

- All kinds of analog(4-20mA, PT100, thermocouple) and digital data are able to be processed on real-time.

- Window mimic display

- On-line maintenance function including data downloading, programming, and data updating
**Product**

**Electric System**

**HFO Treatment Control Panel**

- HFO Treatment Control Panel is designed for fuel supply system of land power plant.
- KOMECO has manufactured and applied this control panel over years.
- Based on these experiences, KOMECO now has the design and production systems that can rapidly satisfy requirements.

  → **Applied engine**: HHI-HIMSEN H21/32, H25/33

  → **Parts**:
    - Group annunciator
    - Control logic: PLC and relay logic
    - Touch panel

**Main Engine Remote Control System**

- Main Engine Remote Control System is designed for main engine proportion and remote control system.
- KOMECO has manufactured and applied them to domestic fishery guide ship and foreign projects over years.
- Based on these experiences, KOMECO now has the design and production systems that can rapidly satisfy requirements.

  → **Type**: CPP & FPP

  → **Applied engines**: H21/33, H25/33, H32/40, L32/40, V32/40

  → **Parts**:
    - M/E local control panel
    - E/S starting box
    - ECR & W/H control panel
    - ECR & W/H indication panel
    - Telegraph system with control unit
    - Air source panel etc.
KOMECO has manufactured the land engine control panel and has applied to major engine maker (HHI) over years.

Based on these experiences, KOMECO now has the design and production systems that can rapidly satisfy requirements.

→ Applied engine: HHI-HIMSEN H21/32, H25/33

→ Parts:
  - Group annunciator
  - Control logic: PLC, relay logic, and microprocessor control
  - Touch panel
  - Speed measuring system
  - Cable supervision system
  - Alarm monitoring system
## Main Customers & Actual Case of Delivery

### Hyundai Heavy Industries Co., Ltd

- Local Control Cabinet With P/P Starter (L32/40)
- LCP With Prelub. Oil P/P Starter (L23/30, L28/32)
- Instrument Box & Terminal Box (L23/30, L28/32)
- Speed Measuring & Loop Fail Monitor (L23/30, L28/32)
- Pick Up For Engine Speed (L23/30, L28/32, L32/40)
- Level Alarm Ass’y (L23/30, L28/32, L27/38, L32/40)
- Aux. Blower & Turning Gear Starter (B&W, SULZER ENG.)
- Local Box & Indicating Panel (B&W ENG.)
- Axial Vibration Monitor (B&W ENG.)
- Turbocharger Tachometer & Pick Up Sensor (B&W, SULZER ENG.)
- Test System For Main Engine
- Propulsion Control & Monitoring System For Rok Navy
- Main Switch Board (P081, P083 PROJECT)
- CYL. Lubrication Starter Panel
- Water Tight Door Indication Box (Container)
- Air Lock System
- Miscom System

### Hyein Co., Ltd

- Alarm Panel (CAT3406, 3412, etc.)
- Em’cy D/G Control Panel (P093)
- D/G Local Operation Panel (P093)
- Battery Charger (P093)
- F.O Supply Unit Control Panel (DW7602, 7505/7506, etc.)
Supply Accomplishment

Main Customers & Actual Case of Delivery

**STX Engine Co., Ltd**

- Engine Control Cabinet (L32/40)
- Governor Controller (CMS ENG.)
- Over Speed Switch (CMS ENG.)
- Em’cy Auto Starter Control Panel (CMS ENG.)
- Tacho System (B&W ENG.)
  1. Mg. Pick Up Sensor
  2. Speed Watch
  3. Tachometer
- Tacho System (NIGATTA ENG.)
  1. Tacho Generator
  2. Rpm Comparator
  3. Tachometer
- Cable Supervision (B&W ENG.)
- Alarm Monitoring (B&W ENG.)
- Speed Transmitter & Resistance Bulb (L23/30, L28/32)
- BATTERY CHARGER & INSTRUMENT PANEL

**Daewoo Shipbuilding & Marine Engineering Co., Ltd.**

- O.O.W Console
- P/H Instrument Panel
- P/H Top Instrument Panel
- Power Dist Panel (KDX- II)
- Transformer (KDX- II)
- Motor Starter (KDX- II)
- Lighting Load Center (KDX- II)
- Main Switch Board, Motor Starter & Shore Conn. Box (NA-91)
Main Customers & Actual Case of Delivery

DooSan Engine Co., Ltd

- Aux. Blower & Turning Gear Starter (B&W, SULZER ENG.)
- Em’cy Control Unit & Indicating Panel For BMS (B&W ENG.)
- CYL. Lubrication Motor Starter (SULZER ENG.)
- Axial Vibration Monitor (B&W ENG.)
- Turbocharger Tachometer & Pick Up Sensor (B&W, SULZER ENG.)
- Engine Speed Pick Up Sensor (L32/40)
- P.C.O / CYL. L.O Non – Flow Alarm Panel (B&W ENG.)
- PLC Cabinet & Control Panel

Defense Procurement Agency

- Low Voltage Supply Unit
- Circuit Card Assembly (GPS-100, MUX-A, MUX-B)
Hello, everyone.

We deeply thank all of you for encouraging and caring us with high interest and attention.

Since its establishment in 1995, KOMECO has been specializing only in ship automation technology.

We all have been making best efforts to develop new technologies under the business motto of “Highest Business Value can be created only with Highest Technology”.

Now in order to advance towards new fields like alternative energy industry using wind power and sunlight, we are doing our best to learn applicable technologies and do relevant R&D activities.

We promise we will provide highest technology and highest quality and thereon grow together with you. Hoping your continuous attention and affection.

Thank you.

B. C. Kang

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Highest Business Value can be only with Highest technology!

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KOMECO www.komeco.net

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